

## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.



aTC425  
.U6U5  
1973

(\*—\*)

# WORK PLAN

FOR

WATERSHED PROTECTION, FLOOD PREVENTION,  
AGRICULTURAL WATER MANAGEMENT,  
AND RECREATION

## UPPER BAYOU NEZPIQUE WATERSHED

EVANGELINE AND ALLEN PARISHES, LOUISIANA



MARCH 1973

# NATIONAL

# AGRICULTURAL

# LIBRARY



	Page
WATERSHED WORK PLAN AGREEMENT	
Supplement No. 3 -----	I-1
Sponsors -----	II-1
Supplement No. 2 -----	III-1
Synopsis of Planned Measures -----	IV-1
Figure 8 - Project Map -----	IV-13
Supplement No. 1 -----	V-1
SUMMARY OF PLAN -----	1
Land Treatment Measures -----	1
Structural Measures -----	2
Benefits -----	2
Operation and Maintenance -----	2
Provisions for Financing -----	2
DESCRIPTION OF WATERSHED -----	3
Physical Data -----	3
Economic Data -----	5
Land Treatment Data -----	7
WATERSHED PROBLEMS -----	8
Floodwater Damages -----	8
Erosion and Sediment Damages -----	9
Problems Relating to Watershed -----	9
PROJECTS OF OTHER AGENCIES -----	11
BASIS FOR PROJECT FORMULATION -----	11
WORKS OF IMPROVEMENT TO BE INSTALLED -----	13
Land Treatment Measures -----	13
Structural Measures -----	14
EXPLANATION OF INSTALLATION COSTS -----	16
Schedule of Obligations - Land Treatment Measures -----	17
Schedule of Obligations - Structural Measures -----	21
EFFECTS OF WORKS OF IMPROVEMENT -----	21
PROJECT BENEFITS -----	24
COMPARISON OF BENEFITS AND COSTS -----	25
PROJECT INSTALLATION -----	25
FINANCING PROJECT INSTALLATION -----	27
PROVISIONS FOR OPERATION AND MAINTENANCE -----	28
TABLES -----	
Table 1 - Estimated Project Installation Cost -----	30
Table 1A - Status of Watershed Works of Improvement -----	31
Table 2 - Estimated Structural Cost Distribution -----	32
Table 2A - Cost Allocation and Cost Sharing Summary -----	33
Table 2B - Basic Recreational Facilities -----	34
Table 3 - Structure Data - Floodwater Retarding Structure and Water Supply Reservoirs -----	35
Table 3A - Structure Data - Floodway Development -----	36
Table 3B - Structure Data - Drainage Channels -----	37
Table 4 - Annual Costs -----	38
Table 5 - Estimated Average Annual Flood Damage Reduction Benefits -----	39
Table 6 - Comparison of Benefits and Costs for Structural Measures -----	40
INVESTIGATIONS AND ANALYSES -----	41
Cover Conditions and Land Use -----	41
Land Use and Treatment Needs -----	41
Structural Measures -----	41
Engineering Investigations -----	42
Hydraulic and Hydrologic Investigations -----	44
Sedimentation Investigations -----	46
Economic Investigations -----	47
Forestry Investigations -----	49
Fish and Wildlife Investigations -----	49
FIGURES -----	
Figure 1 - Section of a Typical Floodwater Retarding Structure -----	51
Figure 2 - Typical Floodwater Retarding Structure - General Plan and Profile -----	52
Figure 3 - Typical Floodwater Retarding Structure - Structure Plan and Section -----	53
Figure 4 - Section of a Typical Multiple Purpose Structure -----	54
Figure 5 - Typical Channel Profiles and Cross Sections -----	55
Figure 6 - Proposed Floodway -----	56
Figure 7 - Recreation Area -----	57
Figure 8 - Project Map, As Amended -----	IV-13

I-1

SUPPLEMENT NO. 3

to the

WATERSHED WORK PLAN AGREEMENT

between the

EVANGELINE PARISH POLICE JURY  
(Local Organization)

ALLEN PARISH POLICE JURY  
(Local Organization)

EVANGELINE SOIL AND WATER CONSERVATION DISTRICT  
(Local Organization)

CALCASIEU SOIL AND WATER CONSERVATION DISTRICT  
(Local Organization)

State of Louisiana

and the

Soil Conservation Service  
United States Department of Agriculture  
(hereinafter referred to as the Service)

Whereas, the Watershed Work Plan Agreement for the Upper Bayou Nezpique Watershed, State of Louisiana, executed by the Grand Coteau Ridge Soil Conservation District, and the Service, became effective on the 26th day of August, 1957; and

Whereas, in order to carry out the Watershed Work Plan, it became necessary to prepare a supplemental Watershed Work Plan Agreement and revise said Watershed Work Plan; said Supplement becoming effective on the 31st day of August, 1966; and

Whereas, in order to carry out the revised Watershed Work Plan for said watershed, it became necessary to again modify said revised Watershed Work Plan and Watershed Work Plan Agreement as supplemented; said Supplement No. 2 to the Watershed Work Plan Agreement became effective on the 17th day of December, 1968; and





Whereas, in order to carry out the revised Watershed Work Plan it has again become necessary to modify the revised work plan and the Work Plan Agreement as supplemented to provide for assistance and funds as needed to comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646 (84 Stat. 1894) and to provide for the installation of water management structures; and

Whereas, Supplement No. 2 to the Revised Watershed Work Plan dated January 1966 has been developed through the cooperative efforts of the Sponsoring Local Organizations and the Service, which supplement is annexed to and made a part of this Supplemental Work Plan Agreement No. 3; and

Whereas, this Supplemental Watershed Work Plan Agreement No. 3 amends the Watershed Work Plan Agreement as supplemented to permit these additional changes;

Now, therefore, the Sponsoring Local Organizations and the Service hereby agree upon the following modifications of the terms, conditions, and stipulations of said Watershed Work Plan Agreement, as supplemented:

1. Add Paragraph Number 16 on page iv to read as follows:

The Evangeline Parish Police Jury will provide relocation advisory assistance services and make the relocation payments to displaced persons as required by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat. 1894) effective as of January 2, 1971, and the Regulations issued by the Secretary of Agriculture pursuant thereto. Prior to July 1, 1972, the Sponsoring Local Organizations will comply with the real property acquisition policies contained in said Act and Regulations to the extent that they are legally able to do so in accordance with their state law. After July 1, 1972, the real property acquisition policies contained in said Act shall be followed in all cases.

The Service will bear 100 percent of the first \$25,000 of relocation payment costs for any person, business, or farm operation displaced prior to July 1, 1972. Any such costs for a single dislocation in excess of \$25,000 and all costs for relocation payments for persons displaced after July 1, 1972, will be shared by the Sponsoring Local Organizations and the Service as follows:





	Evangeline Parish Police Jury (Percent)	Service (Percent)	Estimated Relocation Payment Costs (Dollars)
Relocation Payments	48.6	51.4	6,300

2. Change paragraph numbered 3 on Page iii to read as follows:

The percentages of construction cost of structural measures to be paid by the Evangeline Parish Police Jury and by the Service are as follows:

Works of Improvement	Evangeline Parish Police Jury (Percent)	Service (Percent)	Estimated Cost (Dollars)
Floodwater Retarding Structures 4,6,7,10,11,12,15,16,17	0	100	1,626,446
Multiple-Purpose Reservoir No. 3 (Recreation, Flood Prevention)	36	64	240,368
No. 5 (Irrigation and Flood Prevention)	28	72	539,000
Floodway	0	100	21,700
Disrupted Drainage Facilities	50	50	15,000
Minimum Basic Facilities	50	50	267,520
Multiple-Purpose Channels	12	88	412,743
Water Management Structures	12	88	144,000
TOTAL			3,266,777



3. Change paragraph numbered 4 on page iii to read as follows:

The percentages of the engineering costs to be borne by the Sponsoring Local Organizations and the Service are as follows:

Works of Improvement	Evangeline Parish		Estimated Engineering Cost (Dollars)
	Police Jury (Percent)	Service (Percent)	
Recreation Facilities	50	50	31,800
All Other Structural Measures	0	100	350,100

4. Change paragraph numbered 5 on page iii to read as follows:

The Evangeline Parish Police Jury and the Service will each bear the costs of Project Administration which each incurs, estimated to be \$39,100 and \$658,800 respectively.

The Sponsoring Local Organizations and the Service further agree to all other terms, conditions, and stipulations of said revised Watershed Work Plan not modified herein.



EVANGELINE PARISH POLICE JURYLocal OrganizationBy /s/ Earl John SoileauTitle PresidentDate April 24, 1972

The signing of this agreement was authorized by a resolution of the governing body of the EVANGELINE PARISH POLICE JURY adopted at a meeting held on April 14, 1972.

/s/ Wilbert J. ArdoinSecretary, Evangeline Parish Police JuryDate April 24, 1972

-----

ALLEN PARISH POLICE JURYLocal OrganizationBy /s/ A. E. SiglerTitle PresidentDate May 11, 1972

The signing of this agreement was authorized by a resolution of the governing body of the ALLEN PARISH POLICE JURY adopted at a meeting held on May 11, 1972.

/s/ Robert L. BrooksSecretary, Allen Parish Police JuryDate May 11, 1972





CALCASIEU SOIL AND WATER CONSERVATION  
DISTRICT  
Local Organization

By /s/ Robert D. Schaefer

Title Chairman

Date May 18, 1972

The signing of this agreement was authorized by a resolution of the governing body of the CALCASIEU SOIL AND WATER CONSERVATION DISTRICT adopted at a meeting held on May 18, 1972.

/s/ John J. Thompson  
Secretary, Calcasieu Soil and Water  
Conservation District  
 Date May 18, 1972

EVANGELINE SOIL AND WATER CONSERVATION  
DISTRICT  
Local Organization

By /s/ Aubrey G. LaHaye

Title Chairman

Date April 25, 1972

The signing of this agreement was authorized by a resolution of the governing body of the EVANGELINE SOIL AND WATER CONSERVATION DISTRICT adopted at a meeting held on April 19, 1972.

/s/ Crompton Johnson  
Secretary, Evangeline Soil and Water  
Conservation District

Date April 25, 1972



Soil Conservation Service  
UNITED STATES DEPARTMENT OF AGRICULTURE

By /s/ J. B. Earle

Title State Conservationist

Date May 19, 1972





## UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

---

Post Office Box 1630  
Alexandria, Louisiana 71301

May 8, 1972

Sponsors, Upper Bayou Nezpique Watershed:

Mr. Roy Fontenot  
President  
Evangeline Parish Police Jury  
Ville Platte, Louisiana 70586

Mr. A. E. Sigler, President  
Allen Parish Police Jury  
P. O. Drawer G  
Oberlin, Louisiana 70655

Mr. Aubrey LaHaye, Chairman  
Evangeline SWCD  
P. O. Box 492  
Ville Platte, Louisiana 70586

Mr. R. D. Schaefer, Chairman  
Calcasieu SWCD  
P. O. Box 211  
Leesville, Louisiana 71446

Gentlemen:

The Soil Conservation Service, Bureau of Sport Fisheries and Wildlife, and Louisiana Wild Life and Fisheries Commission have reviewed this watershed work plan to determine action needed to assure that project installation can be carried out with minimum detrimental effect on fish and wildlife. These three agencies have agreed the following action should be taken to assure the acceptability of the plan and its installation process to those resources:

1. Install a weir or sediment basin at the outlet end of Channel L-1E before this channel enters the main stem of Bayou Nezpique.
2. Terminate construction of Channel L-111A approximately 1/2 mile above its outlet.
3. Replace an existing low dam in Channel L-1L1 with a weir.
4. Install a sediment trap or weir 1,800 feet upstream from the outlet L-1H1.
5. On the main stem of Bayou Nezpique below Highway 10, use a chain saw to cut trees and snake out the debris rather than use a dragline to clear and shape.
6. Allow the lower reaches of L-111 to flood through the woods rather than improve the channel.
7. Stop dragline work on Channel L-11 where its hydraulic gradient intersects the backwater area of Bayou Nezpique.



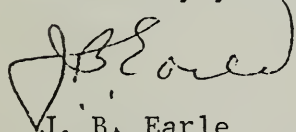


## Sponsors, Upper Bayou Nezpique

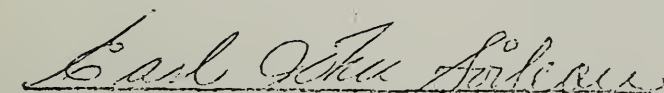
8. Install drop inlets as needed to control side erosion in Channel L-1L2.
9. Redesign Channel L-1J so that excavation can be stopped shortly after it enters the woodland to reduce the necessity of excavation into Bayou Nezpique.
10. Six suggestions are made for the portion of Bayou Nezpique upstream from Highway 10. They are: (a) Dig only that portion of channel which is inadequate in its present condition; (b) Work on one side wherever possible; (c) Where shallow sheet flooding can be accomplished over woodland, allow this flooding to occur; (d) Establish woody plants that are beneficial to wildlife on denuded areas and spoils; (e) Place weirs in this section where they can effectively assist in water management; (f) Establish a satisfactory vegetative cover on the spoil and berm in agricultural areas.
11. Eliminate any channel work on the following channel sections:
  - a. The lower 1,635 feet of L-1H1.
  - b. The lower 900 feet of L-1L2.
  - c. The lower 5,700 feet of L-1K.

The Soil Conservation Service recommends these proposals be accepted by the project sponsors. Before work can continue, the work plan must be supplemented to include these recommendations. This letter may serve as documentation that these recommendations will be carried out as part of project installation provided you indicate your agreement by affixing your signatures in the space provided below. Should each sponsor sign this document, it will serve as necessary documentation of the supplementary agreement for carrying out the provisions stated above.

Sincerely yours,



J. B. Earle  
State Conservationist



Roy. Fontenot, President-  
Evangeline Parish Police Jury  
Earl John Soileau, President



Aubrey LaHaye, Chairman  
Evangeline SWCD

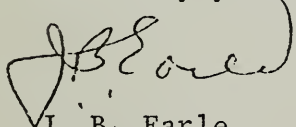


## Sponsors, Upper Bayou Nezpique


8. Install drop inlets as needed to control side erosion in Channel L-1L2.
9. Redesign Channel L-1J so that excavation can be stopped shortly after it enters the woodland to reduce the necessity of excavation into Bayou Nezpique.
10. Six suggestions are made for the portion of Bayou Nezpique upstream from Highway 10. They are: (a) Dig only that portion of channel which is inadequate in its present condition; (b) Work on one side wherever possible; (c) Where shallow sheet flooding can be accomplished over woodland, allow this flooding to occur; (d) Establish woody plants that are beneficial to wildlife on denuded areas and spoils; (e) Place weirs in this section where they can effectively assist in water management; (f) Establish a satisfactory vegetative cover on the spoil and berm in agricultural areas.
11. Eliminate any channel work on the following channel sections:
  - a. The lower 1,635 feet of L-1H1.
  - b. The lower 900 feet of L-1L2.
  - c. The lower 5,700 feet of L-1K.

The Soil Conservation Service recommends these proposals be accepted by the project sponsors. Before work can continue, the work plan must be supplemented to include these recommendations. This letter may serve as documentation that these recommendations will be carried out as part of project installation provided you indicate your agreement by affixing your signatures in the space provided below. Should each sponsor sign this document, it will serve as necessary documentation of the supplementary agreement for carrying out the provisions stated above.

Sincerely yours,



J. B. Earle  
State Conservationist



Roy. Fontenot, President  
Evangeline Parish Police Jury  
Earl John Soileau, President




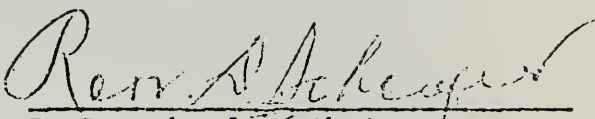
Aubrey LaHaye, Chairman  
Evangeline SWCD

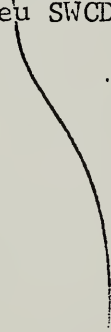




Sponsors, Upper Bayou Nezpique

  
\_\_\_\_\_  
A. E. Sigler, President  
Allen Parish Police Jury

  
\_\_\_\_\_  
R. D. Schaefer, Chairman  
Calcasieu SWCD





SUPPLEMENT NO. 2

TO THE

REVISED WATERSHED WORK PLAN

FOR

WATERSHED PROTECTION, FLOOD PREVENTION,  
AGRICULTURAL WATER MANAGEMENT AND RECREATION

UPPER BAYOU NEZPIQUE WATERSHED

Evangeline and Allen Parishes, Louisiana

Prepared Under the Authority of the  
Watershed Protection and Flood Prevention  
Act, (Public Law 566, 83rd Congress;  
68 Stat. 666) as Amended

Prepared by:

Evangeline Parish Police Jury  
Allen Parish Police Jury  
Evangeline Soil and Water Conservation District  
Calcasieu Soil and Water Conservation District

With Assistance By:  
U. S. Department of Agriculture  
Soil Conservation Service

April 1972





## SUPPLEMENT NO. 2 TO THE REVISED WATERSHED WORK PLAN

UPPER BAYOU NEZPIQUE WATERSHED  
Evangeline and Allen Parishes, Louisiana

April 1972

Purpose of the Supplement

It has become necessary to modify the revised watershed work plan for Upper Bayou Nezpique Watershed to incorporate provisions for implementing the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, to provide for installation of water management structures, and to incorporate the classification of streams on which channel improvement is proposed. In order to simplify the cost-sharing of relocation payments and set forth the provisions for providing relocation advisory assistance services, it is necessary to modify the revised watershed work plan to reflect current policy and terminology relative to engineering and project administration costs.

The following are changes and modifications made in appropriate parts of the revised watershed work plan.

Works of Improvement to be Installed  
Structural Measures

Under present conditions it is estimated that the installation of Floodwater Retarding Structure No. 10 will result in the displacement of one family (6 persons) from one owner occupied dwelling. No other displacements or relocations are apparent at this time.

Low level weirs will be installed in the major channels to provide a greater ability to accomplish total water management. These structures are considered appurtenant to the channel improvement. Approximately 14 of these structures for water management will be installed. They will insure a supply of water in about 23 miles of channel, reduce downstream sediment during and following construction, preclude significant reductions in water table elevation which might otherwise result from channel improvement, mitigate damages to fish and wildlife habitat, decrease channel maintenance costs, and enhance the environment by providing additional water areas.

The estimated 61 miles of channel improvement was classified as follows:

Natural stream - 39 miles  
Man-made or previously modified natural channel - 19 miles  
No defined channel - 3 miles

A detailed classification is shown in Table 3C.



### Explanation of Installation Costs

The total costs for apparent eligible relocation payments resulting from dislocations indicated under "Works of Improvements to be Installed" are estimated to be \$6,300. After July 1, 1972, the share of these costs to be borne by Public Law 566 funds is 51.4 percent and the share to be borne by other funds is 48.6 percent, and are based upon the ratio of Public Law 566 funds and other funds to the total project costs less relocation payments. For those displacements prior to July 1, 1972, Public Law 566 funds will provide the first \$25,000 for each displacement. If other relocations become necessary, relocation payments will be cost-shared in accordance with percentages shown above.

The estimated cost of installing the water management structures is \$154,000, \$144,000 construction costs and \$10,100 engineering services cost.

Engineering services costs consist of, but are not limited to, detailed surveys, geologic investigations, laboratory analyses, reports, designs, and cartographic services.

Public Law 566 project administration costs consist of construction inspection, maintenance of records and accounts, and assistance to the Evangeline Parish Police Jury in providing relocation advisory assistance.

The local costs for project administration include contract administration, overhead and organizational costs, whatever construction inspection they desire to make at their own expense, and all relocation advisory assistance services costs. Costs for providing relocation advisory assistance services are estimated to amount to \$1,000.

### Comparison of Benefits and Costs

The ratio of average annual benefits (\$334,713) without the inclusion of secondary benefits, to the estimated average annual costs (\$236,093) is 1.4:1.0. The total average annual benefits, including secondary benefits, are \$388,689. The benefit-cost ratio is 1.6:1.0. Revised Table 6 shows a comparison of annual costs to annual benefits.

### Project Installation

The Evangeline Parish Police Jury is responsible for providing relocation advisory assistance services and relocation costs associated with Flood-water Retarding Structure No. 10. They will, through their own facilities, or by contract with a fully qualified government agency, (1) provide personally, or by first class mail, written notice of displacement and appropriate application forms to each displaced person or business, (2) give displaced persons notice to vacate at least 90 days prior to the date they must move, (3) assist in filing applications, (4) review and approve applications for relocation assistance, (5) review and process grievances in connection with displacements, and (6) make relocation payments.



The Evangeline Parish Police Jury will provide such measures, facilities, or services as may be necessary or appropriate in order to (1) determine the need, if any, of displaced persons for relocation assistance, (2) provide current and continuing information on the availability, prices, and rentals of comparable decent, safe, and sanitary sale and rental housing, and of comparable commercial properties and locations for displaced businesses and farm operations, (3) assure, that within a reasonable period of time prior to displacement, replacement dwellings will be available, (4) assist a displaced person displaced from his business or farm operation in obtaining and becoming established in a suitable replacement location, (5) supply information concerning housing programs, disaster loan programs, and other federal or state programs offering assistance to displaced persons, (6) provide other advisory services to displaced persons in order to minimize hardships to such persons in adjusting to relocation, (7) advise displaced persons that they should notify the displacing agency before they move, and (8) prior to initiation of acquisition, provide persons from whom it is planned to acquire land a brochure or pamphlet outlining the benefits to which they may be entitled.

The Evangeline Parish Police Jury has determined that decent, safe, and sanitary replacement housing will be available for all persons estimated to be subject to displacement by the project.

#### Financing Project Installation

The local share of costs for relocation payments and all project administration costs for relocation advisory assistance services will be borne by the Evangeline Parish Police Jury which has adequate funds available from tax resources.

#### Tables

Changes caused by this supplement require revision of Tables 1, 2, 2A, 4, and 6, and addition of Table 3C. These tables are attached to this supplement and made a part thereof.





TABLE 1 - ESTIMATED PROJECT INSTALLATION COST  
Upper Bayou Nezpique Watershed, Louisiana

	:	:	:	Estimated Cost (Dollars) <sup>1/</sup>	
	:	:	:	Public Law:	Other :
Installation Cost Item	Unit:	Number	566 Funds :	Funds :	Total
<u>LAND TREATMENT</u>					
Soil Conservation Service					
Conservation Treatment					
Cropland	Acre	39,930	-	1,313,019	1,313,019
Grassland	Acre	13,210	-	454,944	454,944
Technical Assistance			137,834	97,175	235,009
Subtotal - SCS			137,834	1,865,138	2,002,972
Forest Service					
Forest Land	Acre	10,000	-	101,000	101,000
Cooperative Forest Fire Control	Acre	125,000	10,000	10,000	20,000
Technical Assistance			18,500	12,500 <sup>2/</sup>	31,000
Subtotal - FS			28,500	123,500	152,000
TOTAL LAND TREATMENT			166,334	1,988,638	2,154,972
<u>STRUCTURAL MEASURES</u>					
<u>Construction</u>					
Soil Conservation Service					
Floodwater Retarding Structure	No.	9	1,626,446	-	1,626,446
Multiple-Purpose Structure	No.	2	542,993	236,375	779,368
Channel Improvement	Mile	61	361,767	50,976	412,743
Channel Reconstruction for					
Disrupted Facilities	Mile	1.25	7,500	7,500	15,000
Floodway	Mile	0.4	21,700	-	21,700
Minimum Basic Facilities		1	133,760	133,760	267,520
Water Management Structures	No.	14	126,720	17,280	144,000
Subtotal - Construction			2,820,886	445,891	3,266,777
<u>Engineering Services</u>					
Soil Conservation Service			366,000	15,900	381,900
Subtotal - Engineering			366,000	15,900	381,900
<u>Relocation Payments</u>					
Soil Conservation Service			3,250	3,050	6,300
Subtotal - Relocation Payments			3,250	3,050	6,300
<u>Project Administration</u>					
Soil Conservation Service					
Relocation Advisory Assistance					
Services			-	1,000	1,000
Construction Inspection			315,700	11,000	326,700
Other			343,100	27,100	370,200
Subtotal - Administration			658,800	39,100	697,900
<u>Other Costs</u>					
Land Rights			69,840	1,374,210	1,444,050
Subtotal - Other Costs			69,840	1,374,210	1,444,050
TOTAL STRUCTURAL MEASURES			3,918,776	1,878,151	5,796,927
<u>TOTAL PROJECT</u>					
Summary					
Subtotal - SCS			4,056,610	3,743,289	7,799,899
Subtotal - FS			28,500	123,500	152,000
TOTAL PROJECT			4,085,110	3,866,789	7,951,899

<sup>1/</sup> Price Base - 1971, Except actual costs for measures already installed or under contract

<sup>2/</sup> To be provided by the Louisiana Forestry Commission

April 1972





TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Upper Bayou Nezpique Watershed, Louisiana

(Dollars) 1/

Item	Installation Cost - Public Law 566 Funds				Installation Cost - Other Funds				Total	
	Construction	Engineering	Land Rights	Relocation Payments2/	Total PL-566 Funds	Construction	Engineering	Land Rights	Relocation Payments2/	Total Other Funds
<b>Single Purpose</b>										
<b>Floodwater Retarding Structures</b>										
Site No. 4	337,700	43,900	-	-	381,600	-	-	160,500	-	160,500
Site No. 6	104,990	13,600	-	-	118,590	-	-	24,300	-	24,300
Site No. 7	57,906 3/	7,500	-	-	65,406	-	-	10,700	-	10,700
Site No. 10	389,400	50,600	-	3,250	443,250	-	-	366,400	3,050	369,450
Site No. 11	96,910	12,600	-	-	109,510	-	-	11,700	-	11,700
Site No. 12	116,930	15,200	-	-	132,130	-	-	16,400	-	16,400
Site No. 15	148,390	19,300	-	-	167,690	-	-	42,500	-	42,500
Site No. 16	164,670	21,400	-	-	186,070	-	-	120,100	-	120,100
Site No. 17	209,500	27,200	-	-	236,700	-	-	104,600	-	104,600
Floodway	21,700	1,500	-	-	23,200	-	-	1,500	-	1,500
Disrupted Facilities	7,500	500	-	-	8,000	7,500	-	200	-	7,700
<b>Multiple Purpose</b>										
Site No. 3	153,835 3/	31,300	63,010	-	248,145	86,533 3/	-	75,610 4/	-	162,143
Recreation Facilities	133,760	15,900	6,830	-	156,490	133,760	15,900	7,500 5/	-	157,160
Site No. 5	389,158	70,100	-	-	459,258	149,842	-	227,700	-	377,542
Channel Improvement	361,767	25,300	-	-	387,067	50,976	-	204,500	-	255,476
Water Management Structures	126,216	10,100	-	-	136,316	17,784	-	-	-	17,784
<b>Subtotal</b>	<b>2,820,382</b>	<b>366,000</b>	<b>69,840</b>	<b>3,250</b>	<b>3,259,472</b>	<b>446,395</b>	<b>15,900</b>	<b>1,374,210</b>	<b>3,050</b>	<b>1,839,555</b>
<b>Project Administration</b>	-	-	-	-	658,800	-	-	-	-	39,100
<b>GRAND TOTAL</b>	<b>2,820,382</b>	<b>366,000</b>	<b>69,840</b>	<b>3,250</b>	<b>3,918,272</b>	<b>446,395</b>	<b>15,900</b>	<b>1,374,210</b>	<b>3,050</b>	<b>1,878,655</b>

1/ Price Base: 1971, except actual costs for measures already installed or under contract.

2/ Relocation payments for displacements prior to July 1, 1972 will be shared as provided in PL-91-646 and in paragraph numbered 16 of the agreement.

3/ Actual cost of contract

4/ Includes \$12,600 for legal fees

5/ Includes \$670 for legal fees

APRIL 1972

III-6



TABLE 2A - COST ALLOCATION AND COST SHARING SUMMARY

Upper Bayou Nezpique Watershed, Louisiana  
(Dollars) 1/

		Cost Allocation - Purpose			
		Flood Prevention:	Increased Efficiency:	Irrigation:	Recreation: Total
<u>Single Purpose</u>					
Floodwater Retarding Structures	2,701,246	-	-	-	2,701,246
Floodway	24,700	-	-	-	24,700
Disrupted Facilities	-	15,700	-	-	15,700
<u>Multiple Purpose</u>					
Site No. 3	76,066	-	-	334,222	410,288
Recreation Facilities	-	-	-	313,650	313,650
Site No. 5	371,539	-	465,261	-	836,800
Channel Improvement	483,833	158,710	-	-	642,543
Water Management Structures	116,037	38,063	-	-	154,100
TOTAL	3,773,421	212,473	465,261	647,872	5,099,027
		Cost Sharing - PL-566			
<u>Single Purpose</u>					
Floodwater Retarding Structures	1,840,996	-	-	-	1,840,996
Floodway	23,200	-	-	-	23,200
Disrupted Facilities	-	8,000	-	-	8,000
<u>Multiple Purpose</u>					
Site No. 3	76,066	-	-	172,079	248,145
Recreation Facilities	-	-	-	156,490	156,490
Site No. 5	270,440	-	188,818	-	459,258
Channel Improvement	329,844	57,223	-	-	387,067
Water Management Structures	116,037	20,279	-	-	136,316
TOTAL	2,656,583	85,502	188,818	328,569	3,259,472
		Cost Sharing - Other			
<u>Single Purpose</u>					
Floodwater Retarding Structures	860,250	-	-	-	860,250
Floodway	1,500	-	-	-	1,500
Disrupted Facilities	-	7,700	-	-	7,700
<u>Multiple Purpose</u>					
Site No. 3	-	-	-	162,143	162,143
Recreation Facilities	-	-	-	157,160	157,160
Site No. 5	101,099	-	276,443	-	377,542
Channel Improvement	153,989	101,487	-	-	255,476
Water Management Structures	-	17,784	-	-	17,784
TOTAL	1,116,838	126,971	276,443	319,303	1,839,555

1/ Price Base - 1971, except actual costs for measures already installed or under contract.



TABLE 3C - Classification of Channel Work  
Upper Bayou Nezpique Watershed, Louisiana

Project	Miles	Type of Work	Type of Channel	Flow Conditions Prior to Project
Upper Bayou Nezpique	19	II	M	I
	17	III	N	I
	3	I	O	E
	17	II	N	I
	5	II	N	E
Total Miles	61	-	-	-

Watershed Summary in miles for each code classification	I = 3	N = 39	I = 53
	II = 41	M = 19	E = 8
	III = 17	O = 3	

Total	61	61	61	61
-------	----	----	----	----

#### Coding System for Channel Classification

Type of Work

- I - Establishment of new channel including necessary stabilization measures.
- II - Enlargement of existing channel or stream.
- III - Cleaning out natural or man-made channel (includes major clearing and snagging operation).

Type of Channel (prior to project)

- N - An unmodified, well defined natural channel or stream.
- M( ) - Man-made ditch or previously modified channel. ( ) shows approximate date of original major construction.
- O - None or practically no defined channel.

Flow Conditions (prior to project)

- I - Intermittent - continuous flow through some seasons of the year but little or no flow through other seasons.
- E - Ephemeral - flows only during periods of excessive runoff.





TABLE 4 - ANNUAL COSTS

Upper Bayou Nezpique Watershed, Louisiana  
(Dollars)

Evaluation Unit	: Amortized : Installation : Cost <sup>1/</sup>	: Operation & : Maintenance : Cost <sup>2/</sup>	: Total Cost
Floodwater Retarding Structures, Floodway, Multiple-Purpose Structures, Diversion, Channel Improvement, and Minimum Basic Facilities	172,755	39,693	212,448
Project Administration	23,645	-	23,645
GRAND TOTAL	196,400	39,693	236,093

<sup>1/</sup> Price Base - 1971 except actual costs for measures already installed or under contract, amortized for 100 years @ 3½ percent.

<sup>2/</sup> Adjusted normalized prices; includes \$10,232 for replacement cost.

APRIL 1972



TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Upper Bayou Nezpique Watershed, Louisiana  
(Dollars) 1/

Evaluation Unit	Flood Prevention		Agricultural Water Management		Irrigation		Recreation		Secondary		Average:Benefit	
	Damage	Reduction <sup>2/</sup>	More Intensive	Increased	Efficiency	Recreation	Recreation	Recreation	Secondary	Total	Annual : Cost	Cost <sup>4/</sup> : Ratio
Floodwater Retarding Structures, Floodway, Multiple-Purpose Structures, Diversion, Channel Improvement, and Minimum Basic Facilities	154,583		40,057	18,662	35,793	15,618	70,000	53,976	388,689	212,448	1.8:1	
Project Administration	-	-	-	-	-	-	-	-	-	23,645	-	-
GRAND TOTAL	154,583		40,057	18,662	35,793	15,618	70,000	53,976	388,689	236,095	1.6:1	

1/ Benefits - adjusted normalized prices; costs from Table 4

2/ From Table 5. An additional \$3,632 of benefits are due to land treatment measures.

3/ Includes \$37,034 from reduced production cost and \$7,608 from increased prices received as a result of improved quality.

4/ From Table 4

APRIL 1972



A SYNOPSIS OF PLANNED MEASURES

UPPER BAYOU NEZPIQUE WATERSHED

Evangeline and Allen Parishes, Louisiana

November 1968



### Need for This Synopsis

Between 1954 and 1969, a number of independent comprehensive actions have been taken by the Soil Conservation Service and local sponsors in this watershed. An original work plan was prepared, a revised work plan was prepared, and a supplement to the revised work plan was prepared. This synopsis is prepared in order that all pertinent data may be available in one single document for use by the Service and the Local Sponsoring Organizations. It places in orderly fashion a brief outline of previous action taken, and lists all current plans as they now stand. This will permit reference to only a single document rather than the several plans and supplements.

### Background

In response to a request for assistance in alleviating watershed problems in the Upper Bayou Nezpieque Watershed, planning was initiated in 1955. As a result of inadequate local authority to carry out works of improvement, no measures in the original plan were installed. Subsequently, it was recognized that additional water and related land use problems were present which could be alleviated under Public Law 566 as amended. Changes in Public Law 566 provided a climate in which these additional considerations could be met.

### Watershed Work Plan

In response to a request for assistance in alleviating problems in the Upper Bayou Nezpieque Watershed, a work plan was completed in April 1957 with the Grand Coteau Ridge Soil Conservation District as the local sponsoring organization. Watershed protection and flood prevention were the only project purposes in this plan which included needed land treatment and 12 floodwater retarding structures having an aggregate storage capacity of 37,235 acre-feet. The total estimated installation cost was \$2,191,505, of which \$1,442,550 was for land treatment and \$748,955 was for structural measures. A comparison of the average annual benefits of \$58,994 from structural measures to the average annual cost of \$30,843 for installation of these measures produced a benefit-cost ratio of 1.92 to 1.

Project installation, intended to be completed in five years, was approved in 1957. However, due to the lack of local authority, including inability to carry out financial responsibilities, the initiation of construction of the planned improvements was deferred.

### Revised Watershed Work Plan

An amended application for assistance was submitted in 1961. During the intervening period since the original plan was developed, the local people recognized that a higher level of flood protection was needed. Intermittent drought and a declining groundwater table pointed up the need for additional water for irrigation. Subsequent amendments to Public Law 566 providing for Federal assistance in recreational and fish and wildlife development made it possible





to more fully satisfy watershed needs. Consequently, the amended application included the Evangeline Parish Police Jury as a co-sponsor with the Grand Coteau Ridge Soil Conservation District and requested that drainage improvement, irrigation water supply, and recreational and fish and wildlife development be added to project purposes.

As a result of this request, the Watershed Work Plan was revised in 1966 as follows:

1. Changed the name of the GRAND COTEAU RIDGE SOIL CONSERVATION DISTRICT to GRAND COTEAU RIDGE SOIL AND WATER CONSERVATION DISTRICT.
2. Included the ALLEN PARISH POLICE JURY as a project sponsor.
3. Included the EVANGELINE PARISH POLICE JURY as a project sponsor.
4. Increased the number of floodwater retarding structures from 12 to 16.
5. Provided improvement of about 61 miles of channel. Studies showed that with only 12 structures and channel improvement in place, considerable flooding occurs in the lower reaches of Bayous Nezpique and Grand Louis. The inclusion of the additional four structures and channel improvement was necessary for the proper functioning of the other structural measures and to meet project objectives.
6. Provided additional storage in one site for enjoyment of water-based recreational activities.
7. Provided additional storage in one site for supplemental irrigation water.
8. Provided public facilities for the enjoyment of water-based recreational activities.

The total estimated installation cost was \$8,443,207, of which \$2,154,972 was for land treatment and \$6,288,235 was for structural measures. A comparison of the average annual benefits of \$318,130 from structural measures to the average annual cost of \$248,698 for installation of these measures produced a benefit-cost ratio of 1.3 to 1.

A 10-year installation period for works of improvement was agreed to in this Revised Watershed Work Plan.

#### Revised Watershed Work Plan Supplement

Recent amendments to Public Law 566 provide that no single structure may provide more than 12,500 acre-feet of floodwater detention capacity. Prior to this amendment, no single structure could provide more than 5,000 acre-feet of floodwater detention capacity. In this light, the Sponsoring Local Organizations requested the Service review the Revised Watershed Work Plan and combine structures where a more economical plan could be provided without jeopardizing benefits anticipated in the Revised Work Plan. They also requested the relocation of the recreation area.



The restudy revealed the increase in maximum capacity of floodwater detention as permitted will allow the combinations of certain structures while providing a comparable level of protection. Changes in major features include (1) provision of sufficient additional storage in certain dams to allow the elimination of other dams upstream, and (2) the relocation of the minimum basic facilities for recreation. Specific changes in major features are:

1. The necessity for single-purpose flood prevention Dam No. 1 and No. 2 has been eliminated. Each of these were to be constructed upstream from Dam No. 4. Required capacities, both flood detention and sediment, have been increased as necessary in Site No. 4 to provide the same level of protection as provided in the Revised Work Plan (January 1966), but at a reduced cost.
2. The necessity for single-purpose flood prevention Dam No. 8 and No. 9 has been eliminated. Each of these dams were to be constructed upstream from Dam No. 10. Required capacities, both flood detention and sediment, have been increased as necessary in Site No. 10 to provide a comparable level of protection as provided in the Revised Work Plan, but at a reduced cost.
3. The necessity for single-purpose flood prevention Dam No. 13 and No. 14 has been eliminated. These dams were to have been constructed above the junction of Caney Creek and West Fork of Caney Creek, one on each stream. One dam (Dam No. 17) will be constructed just below the junction of these two streams. This single dam will provide the same level of protection as the two separate ones, but at a reduced cost.
4. Dam No. 5 is planned to be a multiple-purpose structure providing capacity for storage of irrigation water and for flood prevention. The structure was planned to provide 6.00 inches of flood detention capacity. Engineering Memorandum-27, Supplement 3 (Revised 5/18/67), sets minimum standards for flood detention capacity. This site required 7.30 inches of flood detention capacity under the provisions of this memorandum, and this supplement provides for this increase in detention storage.

Since this is a multiple-purpose site and costs are allocated on the basis of storage by purposes (Use of Facility), the additional capacity provided for flood detention causes a small change in the cost sharing. The revised work plan provided that 30 percent of the construction costs would be borne by local funds and 70 percent by Public Law 566 funds. This supplement provides for 28 percent of the construction cost to be borne by the local funds and 72 percent by Public Law 566 funds.

5. Dam No. 3, a multiple-purpose flood prevention and recreation structure, is to be constructed upstream from Dam No. 4. The additional detention capacity to be provided in Site No. 4 under provisions of this supplement (Item 1) causes a higher tailwater at the principal spillway outlet for Dam No. 3. The resulting reduction in available head on the principal spillway for Dam No. 3 has required a more costly spillway conduit and inlet structure. This cost increase is minor and no change in percent cost sharing is necessary.





6. The Sponsoring Local Organizations requested that the minimum basic facilities be relocated in an area along the southeast shoreline of the reservoir of Dam No. 3. The estimated installation cost of the minimum basic facilities will not change as a result of relocation.

The sponsors also requested that:

1. The name GRAND COTEAU RIDGE SOIL AND WATER CONSERVATION DISTRICT be changed to EVANGELINE SOIL AND WATER CONSERVATION DISTRICT.
2. The CALCASIEU SOIL AND WATER CONSERVATION DISTRICT be included as a sponsor.

### Current Plan

This plan is co-sponsored by the Evangeline Parish Police Jury, the Allen Parish Police Jury, the Evangeline Soil and Water Conservation District, and the Calcasieu Soil and Water Conservation District with technical assistance from the Soil Conservation Service and the Forest Service of the U. S. Department of Agriculture and the Department of Public Works of the State of Louisiana.

The primary objectives of the project are watershed protection, flood prevention, agricultural water management and recreation. The proposed plan, consisting of nine single-purpose flood prevention reservoirs, one multiple-purpose flood prevention and recreation reservoir, one multiple-purpose flood prevention and irrigation water storage reservoir, 2,200 feet of floodway for flood prevention, one recreation area with minimum basic facilities, and about 61 miles of channel improvement for flood prevention and agricultural water management meets these objectives. The plan proposes installing structural measures in a five-year period and land treatment measures in a 10-year period. The total project cost is \$7,901,397.

The average annual costs of installation amount to \$234,382. Comparison of these costs to average annual benefits amounting to \$388,689 shows that the benefit-cost ratio is 1.7 to 1. Public Law 566 costs are \$4,079,942, or 51.6 percent of total costs; the costs to other funds are \$3,821,455, or 48.4 percent.

Tables 1 through 6 present pertinent structural data, costs, and the benefit analysis. The project map, Figure 8, shows the locations and types of structural measures and the benefited areas.



TABLE 1 - ESTIMATED PROJECT INSTALLATION COST  
Upper Bayou Nezpique Watershed, Louisiana

	:	:	:	Estimated Cost (Dollars) <sup>1/</sup>	
	:	:	:	Public Law :	Other :
Installation Cost Item	:Unit	: Number:	566 Funds :	Funds :	Total
LAND TREATMENT					
Soil Conservation Service					
Conservation Treatment					
Cropland	Acre	39,930	-	1,313,019	1,313,019
Grassland	Acre	13,210	-	454,944	454,944
Technical Assistance			137,834	97,175	235,009
Subtotal - SCS			137,834	1,865,138	2,002,972
Forest Service					
Forest Land	Acre	10,000	-	101,000	101,000
Cooperative Forest Fire					
Control	Acre	125,000	10,000	10,000	20,000
Technical Assistance			18,500	12,500 <sup>2/</sup>	31,000
Subtotal - FS			28,500	123,500	152,000
TOTAL LAND TREATMENT			166,334	1,988,638	2,154,972
STRUCTURAL MEASURES					
Soil Conservation Service					
Construction					
Floodwater Retarding					
Structure	Each	9	1,718,750	-	1,718,750
Multiple-Purpose Structure	Each	2	560,191	245,009	805,200
Stream Channel Improvement	Mile	61	361,767	50,976	412,743
Channel Reconstruction for					
Disrupted Facilities	Mile	1.25	7,472	7,472	14,944
Floodway	Mile	0.4	21,716	-	21,716
Minimum Basic Facilities		1	133,760	133,760	267,520
Subtotal - Construction			2,803,656	437,217	3,240,873
Installation Services					
Engineering Services			812,222	46,613	858,835
Other			270,580	-	270,580
Subtotal - Installation Services			1,082,802	46,613	1,129,415
Other Costs					
Land, Easements, and Rights-of-Way					
Value of Land			23,400	571,326 <sup>3/</sup>	594,726
Modification of Facilities			3,750	751,561	755,311
Contract Administration			-	26,100	26,100
Subtotal - Other Costs			27,150	1,348,987	1,376,137
TOTAL STRUCTURAL MEASURES			3,913,608	1,832,817	5,746,425
TOTAL PROJECT			4,079,942	3,821,455	7,901,397

1/ Price Base: 1968.

2/ To be provided by Louisiana Forestry Commission.

3/ Includes cost of acquiring easements.





TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION  
Upper Bayou Nezpique Watershed, Louisiana  
(Dollars) <sup>1/</sup>

Site No. or Name	Installation Cost - Public Law 566 Funds					Installation Cost - Other Funds					Total	
	Construction	Engineering	Other	Installation Services	Public Law 566 Funds	Construction	Services	Installation	Administration of Rights-of-Way	Land, Easements, and	Other Funds	Cost
Site No. 4	337,700	89,491	28,195	-	455,386	-	-	-	1,000	160,504	161,504	616,890
6	171,930	45,561	14,355	-	231,846	-	-	-	1,000	24,284	25,284	257,130
7	83,270	22,067	6,952	-	112,289	-	-	-	1,000	10,747	11,747	124,036
10	389,400	103,191	32,511	-	525,102	-	-	-	1,000	366,406	367,406	892,508
11	96,910	25,681	8,091	-	130,682	-	-	-	1,000	11,660	12,660	143,342
12	116,930	30,986	9,763	-	157,679	-	-	-	1,000	16,401	17,401	175,080
15	148,390	39,324	12,389	-	200,103	-	-	-	1,000	42,549	43,549	243,652
16	164,670	43,638	13,748	-	222,056	-	-	-	1,000	120,079	121,079	343,135
17	209,550	55,531	17,495	-	282,576	-	-	-	1,000	104,588	105,588	388,164
Subtotal	1,718,750	455,470	143,499	-	2,317,719	-	-	-	9,000	857,218	866,218	3,183,937
Site No. 3 (rec. & F. P.)	171,033	70,543	22,225	-	263,791	-	-	-	2,000	29,430	126,597	415,548
Site No. 5 (irrig. & F. P.)	389,158	142,835	45,001	-	576,994	-	-	-	5,000	227,697	382,539	959,533
Subtotal	560,191	213,378	67,226	-	840,795	-	-	-	7,000	257,127	509,136	1,375,081
Minimum Basic Facilities	133,760	24,279	22,334	-	180,373	-	-	-	1,500	2,400	184,273	366,646
Subtotal	361,767	109,377	34,460	-	505,604	-	-	-	8,000	204,481	263,457	769,061
Stream Channel Improvement	7,472	3,963	1,248	-	12,683	-	-	-	100	209	7,781	20,464
Disrupted Facilities	369,239	113,340	35,708	-	518,287	-	-	-	8,100	204,690	271,238	789,525
Floodway	21,716	5,755	1,813	-	29,284	-	-	-	500	1,452	1,952	31,236
Subtotal	2,803,656	812,222	270,580	-	3,913,608	-	-	-	500	1,452	1,952	31,236
GRAND TOTAL									26,100	1,322,887	1,832,817	5,746,425

1/ Price Base: 1968  
2/ Includes \$4,280 for legal fees  
3/ Includes \$400 for legal fees

November 1968



TABLE 2A - COST ALLOCATION AND COST-SHARING SUMMARY  
Upper Bayou Nezpique Watershed, Louisiana  
(Dollars)<sup>1/</sup>

Item	Purpose				Total
	Flood Prevention	Recreation	Agricultural Water Management		
			Increased Efficiency	Irrigation	
<u>COST ALLOCATION</u>					
Single Purpose					
Floodwater Retarding Structures Sites 4, 6, 7, 10, 11, 12, 15, 16, 17	3,183,937	-	-	-	3,183,937
Floodway	31,236	-	-	-	31,236
Disrupted Facilities	-	-	20,464	-	20,464
Minimum Basic Facilities	-	366,646	-	-	366,646
Multiple Purpose					
Site 3	102,856	312,692	-	-	415,548
Site 5	425,812	-	-	533,721	959,533
Stream Channel Improvement	579,098	-	189,963	-	769,061
TOTAL	4,322,939	679,338	210,427	533,721	5,746,425
<u>COST SHARING</u>					
Public Law 566	3,191,123	369,018	99,188	254,279	3,913,608
Other	1,131,816	310,320	111,239	279,442	1,832,817
TOTAL	4,322,939	679,338	210,427	533,721	5,746,425

<sup>1/</sup> Price Base: 1968.

November 1968



TABLE 3 - STRUCTURE DATA  
FLOODWATER RETARDING STRUCTURES AND WATER SUPPLY RESERVOIRS  
Upper Bayou Neapique Watershed, Louisiana

ITEM	Unit	3	4	5	6	7	10	11	12	15	16	17	TOTAL
Drainage Area (Uncontrolled)	Sq. Mi.	7.45	28.52	15.03	6.96	2.78	35.03	3.28	4.77	10.14	12.28	22.23	148.47
Storage Capacity													
Sediment	Ac. Ft.	143	1,490	577	341	118	673	152	130	81	118	273	4,096
Floodwater	Ac. Ft.	3,223	12,421	5,852	2,707	1,083	12,423	1,278	1,855	3,948	4,847	9,603	59,240
Recreation	Ac. Ft.	1,415	-	-	-	-	-	-	-	-	-	-	1,415
Irrigation	Ac. Ft.	-	-	8,057	-	-	-	-	-	-	-	-	8,057
Total	Ac. Ft.	4,786	13,915	14,486	3,048	1,201	13,096	1,430	1,985	4,029	4,965	9,876	72,817
Between High and Low Stages	Ac. Ft.	1,410	5,590	2,886	1,476	583	6,539	695	1,045	2,028	2,476	4,268	28,996
Surface Area													
Sediment Pool	Acres	60	290	185	68	20	300	30	-	-	-	-	953
Floodwater Pool	Acres	940	1,840	1,535	518	235	1,910	257	398	624	734	1,628	10,619
Recreation Pool	Acres	432	-	-	-	-	-	-	-	-	-	-	432
Irrigation Pool	Acres	-	-	1,051	-	-	-	-	-	-	-	-	1,051
Volume of Fill	Cu. Yd.	63,390	166,600	239,000	135,620	45,890	176,500	45,290	76,740	121,450	139,100	108,700	1,318,280
Elevation Top of Dam (Settled)	Ft. MSL	101.5	99.4	102.6	105.5	95.3	87.7	85.2	80.1	90.0	86.9	87.9	-
Maximum Height of Dam	Ft.	22	33	35	-	20	26.5	19	16	27	28	32	-
Emergency Spillway													
Crest Elevation	Ft. MSL	98.5	94.4	100.0	100.9	92.1	83.1	81.7	76.0	86.3	83.5	85.0	-
Bottom Width	Ft.	100	400	200	100	75	800	50	80	100	300	600	-
Type		2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	-
Percent Chance of Use	Percent	4	4	4	4	4	3	4	4	4	4	4	-
Average Curve No-Condition II		75	75	75	75	75	75	75	75	75	75	75	-
Emergency Spillway Hydrograph													
Storm Rainfall (6-hr.)	In.	10.0	10.0	7.90	7.90	7.90	10.7	7.90	7.90	7.90	7.90	8.00	-
Storm Runoff	In.	6.87	6.87	4.75	4.95	4.95	7.35	5.01	5.01	5.00	4.87	5.15	-
Velocity of Flow (VC) 1/	Ft./Sec.	2.8	4.2	-	-	-	-	4.10	4.00	4.45	-	-	-
Discharge Rate 2/	CFS	273	3,935	-	-	-	-	108	163	272	-	-	-
Maximum Water Surface Elevation 1/	Ft. MSL	99.2	96.6	-	-	-	-	82.2	76.6	86.7	-	-	-
Freeboard Hydrograph													
Storm Rainfall (6-hr.)	In.	15.60	15.60	15.60	15.60	15.60	23.00	15.60	15.60	15.60	15.60	15.90	-
Storm Runoff	In.	12.12	12.12	11.70	12.21	12.21	19.70	12.36	12.36	12.34	12.03	12.73	-
Velocity of Flow (VC) 1/	Ft./Sec.	7.20	5.60	7.50	7.65	6.60	11.4	8.15	8.70	8.60	6.55	6.00	-
Discharge Rate 2/	CFS	1,309	10,646	2,650	1,410	670	32,700	842	1,641	1,976	2,600	6,200	-
Maximum Water Surface Elevation 1/	Ft. MSL	101.2	99.4	102.6	104.3	94.6	87.7	85.2	80.1	90.0	86.4	87.9	-
Principal Spillway													
Capacity-Low Stage	CFS	50	243	101	47	19	218	22	32	68	83	150	-
Capacity-High Stage	CFS	220	1,045	583	132	76	3,860 3/	88	99	190	194	417	-
Capacity Equivalents													
Sediment Volume	In.	0.36	0.98	0.72	0.92	0.80	0.36	0.87	0.51	0.15	0.18	0.23	-
Detention Volume	In.	8.11	8.17	7.30	7.30	7.30	6.65	7.30	7.30	7.30	7.40	8.10	-
Recreation Volume	In.	3.56	-	-	-	-	-	-	-	-	-	-	-
Irrigation Volume	In.	-	-	10.05	-	-	-	-	-	-	-	-	-
Spillway Storage	In.	6.87	5.35	5.61	4.77	4.78	5.69	6.65	7.10	5.41	4.15	4.79	-
Class of Structure	-	A	A	A	A	A	A	A	A	A	A	A	-

1/ Maximum during passage of hydrograph

2/ Vegetated

3/ 3,860 CFS at Emergency Spillway Crest

November 1968





TABLE 4 - ANNUAL COSTS

Upper Bayou Nezpique Watershed, Louisiana

(Dollars)

Evaluation Unit	:	Amortized	:	Operation &	:
	:	Installation	:	Maintenance	:
	:	Cost <sup>1/</sup>	:	Cost <sup>2/</sup>	:
					Total
					Cost
Floodwater Retarding Structures, Floodway, Multiple-Purpose Structures, Diversion, Channel Improvement, and Minimum Basic Facilities		194,689		39,693	234,382
TOTAL		194,689		39,693	234,382

<sup>1/</sup> Price Base: 1968 amortized for 100 years @ 3½ percent.

<sup>2/</sup> Adjusted normalized prices, includes \$10,232 for replacement cost.

November 1968



TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

Upper Bayou Nezpique Watershed, Louisiana

(Dollars)<sup>1/</sup>

	: Estimated Average Annual Damage :		Damage
	: Without	: With	: Reduction
Item	: Project	: Project	: Benefits
<u>FLOODWATER</u>			
Crop and Pasture	236,026	94,160	141,866
Other Agricultural	10,804	3,282	7,522
Non-Agricultural	1,146	584	562
Road and Bridge	15,245	7,084	8,161
Subtotal	263,221	105,110	158,111
<u>SEDIMENT</u>			
Reservoir	471	367	104
Subtotal	471	367	104
TOTAL	263,692	105,477	158,216 <sup>2/</sup>

<sup>1/</sup> Price Base: Adjusted Normalized Prices.<sup>2/</sup> Includes \$3,632 damage reduction due to land treatment measures.

November 1968



TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Upper Bayou Nespique Watershed, Louisiana

(Dollars)<sup>1/</sup>

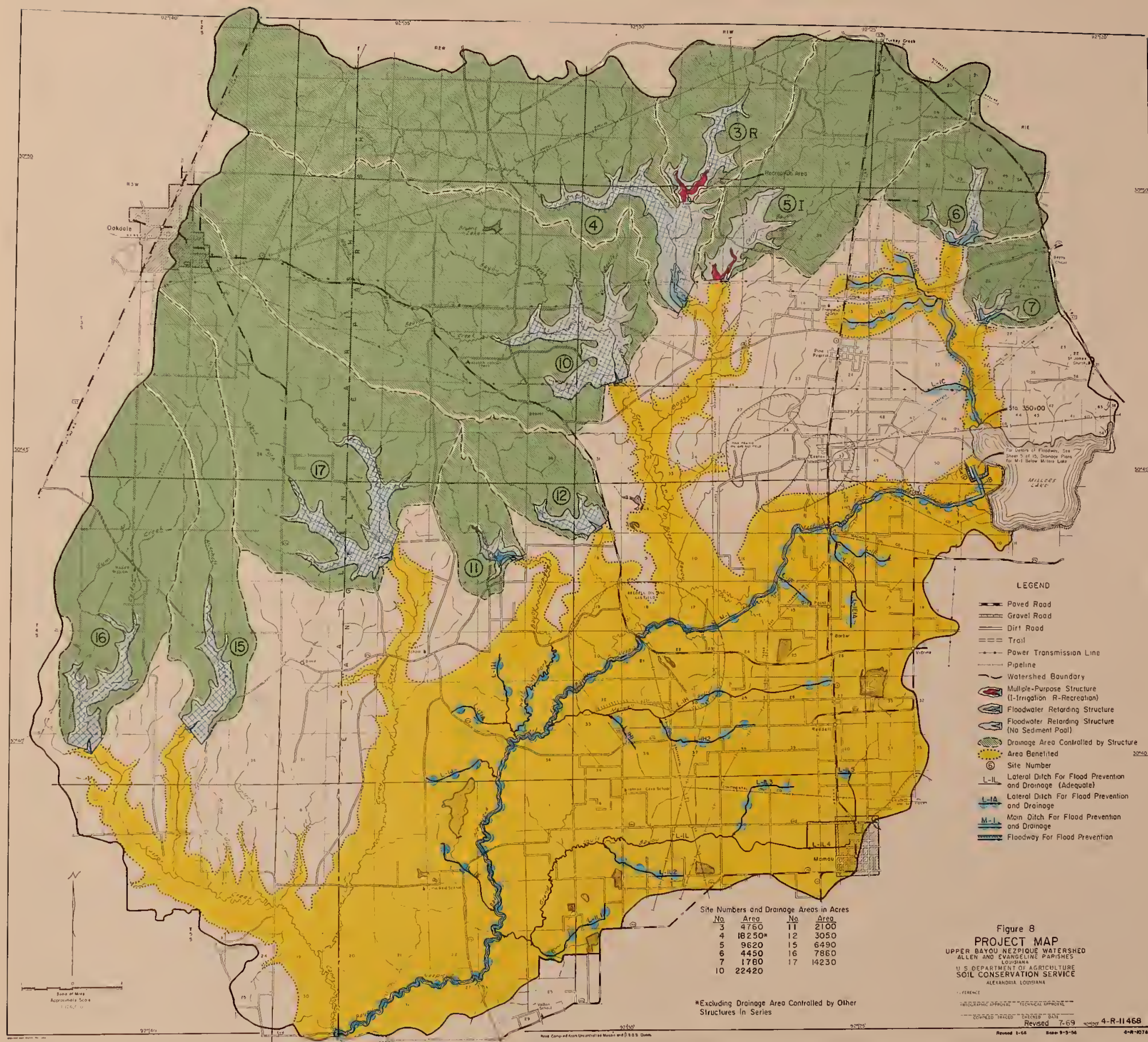
Evaluation Unit	Flood Prevention		Agricultural Water Management <sup>2/</sup>		Recreation	Secondary	Total	Average Annual Cost <sup>3/</sup>	Benefit-Cost Ratio
	Damage Reduction <sup>2/</sup>	Intensive Land Use	Increased Efficiency	Irrigation					
Floodwater Retarding Structures, Floodway, Multiple-Purpose Structures, Diversion, Channel Improvement, and Minimum Basic Facilities	154,583	40,057	18,662	35,793	70,000	53,976	388,689	234,382	1.7:1
TOTAL	154,583	40,057	18,662	35,793	70,000	53,976	388,689	234,382	1.7:1

<sup>1/</sup> Benefits-adjusted normalized prices; costs from Table 4.<sup>2/</sup> From Table 5. An additional \$3,632 of benefits are due to land treatment measures.<sup>3/</sup> Includes \$37,034 from reduced production cost and \$7,608 from increased prices received as a result of improved quality.<sup>4/</sup> From Table 4.

November 1968











SUPPLEMENT NO. 1  
WATERSHED WORK PLAN AGREEMENT

between the

EVANGELINE PARISH POLICE JURY  
(Local Organization)

ALLEN PARISH POLICE JURY  
(Local Organization)

GRAND COTEAU RIDGE SOIL AND WATER CONSERVATION DISTRICT  
(Local Organization)

State of Louisiana  
(hereinafter referred to as the Sponsoring Local Organizations)

and the

Soil Conservation Service  
United States Department of Agriculture  
(hereinafter referred to as the Service)

Whereas, the Watershed Work Plan Agreement for the UPPER BAYOU NEZPIQUE WATERSHED, State of Louisiana, executed by the Grand Coteau Ridge Soil Conservation District and the Service became effective on the 26th day of August, 1957; and

Whereas, in order to carry out the Watershed Work Plan for said watershed it has become necessary to modify said Watershed Work Plan Agreement; and

Whereas, it has been found necessary to revise the Watershed Work Plan in the following respects:

1. Change the name of the Grand Coteau Ridge Soil Conservation District to GRAND COTEAU RIDGE SOIL AND WATER CONSERVATION DISTRICT,
2. Include the EVANGELINE PARISH POLICE JURY as a project sponsor,
3. Include the ALLEN PARISH POLICE JURY as a project sponsor,
4. Increase the number of floodwater retarding structures from 12 to 16,
5. Provide additional storage in one site for enjoyment of water-based recreational activities,
6. Provide additional storage in one site for supplemental irrigation water,



7. Provide public recreational facilities for the enjoyment of water-based recreational activities,
8. Provide channel improvement of about 61 miles of channel; and

Whereas, a Revised Watershed Work Plan, which replaces the Watershed Work Plan dated April 1957 and approved for operations August 26, 1957, has been developed through the cooperative efforts of the Sponsoring Local Organizations and the Service, which Plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Sponsoring Local Organizations and the Secretary of Agriculture, through the Service, hereby agree on the Revised Watershed Work Plan, and further agree that the works of improvement as set forth in said Revised Plan can be installed in about 10 years.

It is mutually agreed that in installing and operating and maintaining the works of improvement substantially in accordance with the terms, conditions, and stipulations provided for in the Revised Watershed Work Plan:

1. The Evangeline Parish Police Jury and the Allen Parish Police Jury will acquire such land, easements, or rights-of-way as will be needed in connection with the works of improvement. (Estimated cost \$1,517,499.) The percentages of this cost to be borne by these Sponsoring Local Organizations and the Service are as follows:

Works of Improvement	Sponsoring		Estimated Cost
	Local Organizations	Service	
	(percent)	(percent)	(dollars)
Multiple Purpose Structure No. 3 and Basic Recreational Facilities			
Payments to landowners for 1,170 acres and cost of relocation or modification of improvements.	50	50	54,300
Legal fees, survey costs, and other acquisition costs	100	0	4,680
All Other Structural Measures	100	0	1,458,519

2. The Sponsoring Local Organizations will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to State law as may be needed in the installation and operation of the works of improvement.



3. The percentages of construction costs of structural measures to be paid by the Evangeline Parish Police Jury and by the Service are as follows:

Works of Improvement	Evangeline Parish Police Jury (percent)	Service (percent)	Estimated Construction Cost (dollars)
Floodwater Retarding Structures 1, 2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16	0	100	2,019,270
Multiple Purpose Reservoirs No. 3 (Recreation and Flood Prevention)	36	64	249,040
No. 5 (Irrigation and Flood Prevention)	30	70	529,540
Floodway	0	100	21,716
Disrupted Drainage Facilities	50	50	14,944
Minimum Basic Facilities	50	50	267,520
Multiple Purpose Channels	12	88	412,743

4. The percentages of the cost for installation services to be borne by the Sponsoring Local Organizations and the Service are as follows:

Works of Improvement	Sponsoring Local Organizations (percent)	Service (percent)	Estimated Installation Services Cost (dollars)
Water Resource Facilities	0	100	1,131,637
Minimum Basic Facilities	50	50	93,226

5. The Evangeline Parish Police Jury will bear the costs of administering contracts. (Estimated cost \$31,100.)

6. The Grand Coteau Ridge Soil and Water Conservation District will obtain agreements from owners of not less than 50 percent of the land above each reservoir and floodwater retarding structure that they will carry out conservation farm or ranch plans on their land.

7. The Grand Coteau Ridge Soil and Water Conservation District will provide assistance to landowners and operators to assure the installation of the land treatment measures shown in the Watershed Work Plan.





8. The Sponsoring Local Organizations will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.

9. The Evangeline Parish Police Jury will be responsible for the operation and maintenance of the structural works of improvement by actually performing the work or arranging for such work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.

10. The costs shown in this agreement represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.

11. This agreement does not constitute a financial document to serve as a basis for the obligation of Federal funds, and financial and other assistance to be furnished by the Service in carrying out the Watershed Work Plan is contingent on the appropriation of funds for this purpose.

Where there is a Federal contribution to the construction cost of works of improvement, a separate agreement in connection with each construction contract will be entered into between the Service and the Sponsoring Local Organization prior to the issuance of the invitation to bid. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

12. The Watershed Work Plan may be amended or revised, and this agreement may be modified or terminated, only by mutual agreement of the parties hereto.

13. The Sponsoring Local Organizations agree that all land on which Federal assistance is provided will not be sold or otherwise be disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the recreational development in accordance with the operation and maintenance agreement.

14. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

15. The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964 and the regulations of the Secretary of Agriculture (7 C.F.R. Sec. 15.1-15.13), which provide that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any activity receiving Federal financial assistance.



EVANGELINE PARISH POLICE JURYLocal OrganizationBy *John N. Andrus*  
(John N. Andrus)Title **President**Date *3/14/66*

The signing of this agreement was authorized by a resolution of the governing body of the EVANGELINE PARISH POLICE JURY adopted at a Local Organization

meeting held on *3/14/66*

*T. Veillon* (T. Veillon)  
Secretary, Evangeline Parish  
Police Jury

Date *3/14/66*ALLEN PARISH POLICE JURYLocal OrganizationBy *J. B. Pourteau, Jr.*  
(J. B. Pourteau, Jr.)Title **President**Date **March 10, 1966**

The signing of this agreement was authorized by a resolution of the governing body of the ALLEN PARISH POLICE JURY adopted at a meeting Local Organization

held on *Thursday, March 10, 1966*

*Robert L. Brooks* (Robert L. Brooks)  
Secretary, Allen Parish Police Jury

Date *Mar. 10, 1966*



GRAND COTEAU RIDGE SOIL AND WATER  
CONSERVATION DISTRICT

Local Organization

By   
 (Earl Fontenot)

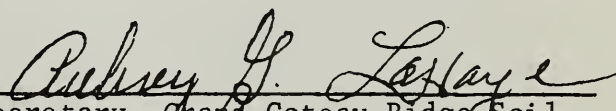
Title Chairman

Date March 24, 1966

The signing of this agreement was authorized by a resolution of the governing body of the GRAND COTEAU RIDGE SOIL AND WATER CONSERVATION DISTRICT

Local Organization

adopted at a meeting held on Thursday, March 24, 1966.

  
 Secretary, Grand Coteau Ridge Soil  
 and Water Conservation District  
 (Aubrey G. LaHaye)  
 Date March 24, 1966

Soil Conservation Service  
 UNITED STATES DEPARTMENT OF AGRICULTURE

By \_\_\_\_\_

Date \_\_\_\_\_



REVISED  
WORK PLAN

FOR

WATERSHED PROTECTION, FLOOD PREVENTION,  
AGRICULTURAL WATER MANAGEMENT, AND RECREATION

UPPER BAYOU NEZPIQUE WATERSHED  
Evangeline and Allen Parishes, Louisiana

Prepared Under the Authority of the Watershed  
Protection and Flood Prevention Act, (Public  
Law 566, 83d Congress, 68 Stat. 666), as  
amended.

Prepared by:

Evangeline Parish Police Jury  
(Sponsor)

Allen Parish Police Jury  
(Sponsor)

Grand Coteau Ridge Soil and Water Conservation District  
(Sponsor)

With Assistance By:

United States Department of Agriculture  
Soil Conservation Service  
Forest Service  
and  
Louisiana Department of Public Works  
January 1966





REVISED  
WATERSHED WORK PLAN

UPPER BAYOU NEZPIQUE WATERSHED  
Evangeline and Allen Parishes, Louisiana  
January 1966

SUMMARY OF PLAN

This work plan for watershed protection, flood prevention, agricultural water management, and recreation in the Upper Bayou Nezpique Watershed was prepared by the Evangeline Parish Police Jury, the Allen Parish Police Jury, and the Grand Coteau Ridge Soil and Water Conservation District as sponsoring local organizations. Technical assistance was provided by the Soil Conservation Service and the Forest Service of the U. S. Department of Agriculture, and the Louisiana Department of Public Works.

The watershed contains 214,200 acres, or about 335 square miles, in Evangeline and Allen Parishes. At present 19 percent of the area is in cropland; 6 percent in grassland; 70 percent in woodland; and 5 percent in miscellaneous uses such as roads, highways, towns, farmsteads, etc. All of the land is privately owned.

The primary objectives of the project are watershed protection, flood prevention, agricultural water management, and recreation. The proposed plan will meet these objectives. The work plan proposes installing, in a 5-year period for structural measures and a 10-year period for land treatment measures, a project for protection and development of the watershed at a total installation cost of \$8,443,207. Public Law 566 will bear \$4,445,248 or 53 percent of this total; and the remaining \$3,997,959, or 47 percent, will be borne by other funds. Local interests will bear the entire cost of operation and maintenance.

Land Treatment Measures

Approximately 50 percent of all needed land treatment measures for watershed protection and improvement will be installed within the 10-year installation period. The cost of these measures is estimated to be \$2,154,972, of which \$1,888,963 is for the cost of installing the practices and includes expected reimbursement from the Agricultural Stabilization and Conservation Service; \$266,009 is for technical assistance and includes \$109,675 presently being provided by the going programs and \$156,334 needed to accelerate technical assistance; and \$20,000 is for cooperative forest fire control, of which half (\$10,000) will be provided under going programs and a like amount by Public Law 566.



Land treatment needed for watershed protection, flood prevention, and agricultural water management, which is expected to be installed during the project period, is shown on table 1.

### Structural Measures

Structural measures to be installed include 14 single-purpose flood prevention structures, 1 multiple-purpose flood prevention and irrigation structure, 1 multiple-purpose flood prevention and recreation structure, 2,200 feet of floodway, 61 miles of multiple-purpose channel improvement, and minimum basic facilities for a recreation area. It will also be necessary to rebuild approximately 1.25 miles of disrupted drainage facilities.

The total cost of structural measures is estimated to be \$6,288,235, of which Public Law 566 will bear \$4,278,914. The remaining \$2,009,321 will be borne by other funds, which includes \$441,259 for construction; \$46,613 for engineering services; \$1,490,349 for land, easements, and rights-of-way, including value of land, legal fees, and removal, modification, or relocation of existing facilities; and \$31,100 for contract administration.

### Benefits

The project will directly benefit approximately 600 farm units. The average annual benefits accruing to structural measures is estimated to be \$318,130. The average annual cost of these measures is \$248,698, which produces a benefit-cost ratio of 1.3 to 1.

### Operation and Maintenance

Land treatment measures will be maintained by the landowners and operators of the farms on which the measures are installed. The Grand Coteau Ridge Soil and Water Conservation District will furnish needed technical assistance for carrying out and operating and maintaining these measures.

Structural measures will be operated and maintained by the Evangeline Parish Police Jury. The people in Evangeline Parish have voted to tax themselves sufficiently to provide funds for operation and maintenance of these measures. Estimated annual operation and maintenance cost is \$42,696, based on long-term prices.

### Provisions for Financing Project Installation

The people of Evangeline Parish have voted to tax themselves to provide a base for borrowing funds for the installation of structural measures in this and two adjacent watersheds. The Louisiana Department of Public Works has agreed to supplement funds available locally. This tax and the State supplement are considered adequate for meeting the local share of financing project installation.

A project agreement will be entered into between the Evangeline Parish Police Jury and the Soil Conservation Service to include the commitments by both parties.





## DESCRIPTION OF WATERSHED

### Physical Data

The Upper Bayou Nezpique Watershed is located in Evangeline and Allen Parishes in the Gulf Coast Prairies, Southern Coastal Plains, and Southern Mississippi Valley Silty Uplands of South Central Louisiana. The watershed, which encompasses 214,200 acres, is located 25 miles south of Alexandria.

Bayou Nezpique heads in the upper reaches of the watershed near the small community of Pine Prairie and has as its major tributaries Caney, Castor, Beaver, and Cypress Creeks, Bayou Blue, and Bayou Grand Louis. It flows in a southerly direction to its confluence with the Mermentau River, near the town of Mermentau.

The topography of the watershed ranges from moderately rolling to nearly level. The moderately rolling topography is generally confined to the north and west portions. Elevations range from 140 feet above m.s.l. in the headwaters to 35 feet at the southern end of this area.

Portions of three Major Land Resource Areas are found in the watershed.

The Southern Coastal Plain Major Land Resource Area is in the northern and western portions. The soils in this land area are silt loams running to fine sandy loams. They range from poorly drained to moderately well drained, slowly to moderately permeable, and are acid throughout the entire profile. Ruston, Bowie, Beauregard, Caddo, Iuka, and Mantachi are examples of the soils found in this section. Some crops are grown in this area; but the major land use is woodland, the predominant species being pine. This area corresponds to the Pine Flats Physiographic Area.

The northeastern portion lies in the Southern Mississippi Valley Silty Uplands Major Land Resource Area. The soils in this area are silt loams. They range from poorly to moderately well drained, slowly permeable to moderately permeable, and are strongly acid. Patoutville, Bude, Providence, and Wrightsville are examples of soils found in this area. This section also corresponds to the Pine Flats Physiographic Area. Cotton, corn, sweet potatoes, small grain, and pasture are the main crops, with woodland also being one of the major land uses.

The southern portion is in the Gulf Coast Prairie Major Land Resource Area. This corresponds to the Coastal Prairie Physiographic Area. The Acadia-Wrightsville soils are the "wooded" soils of this area and are gray silt loam types with clayey subsoils. They are poorly to somewhat poorly drained, very slowly permeable, and generally acid throughout the entire profile. Crops grown in the area are rice, small grains, and pasture. The Prairie portion of this area is composed of the Crowley-Midland soils. They are gray to grayish-brown, silt loam to silty, clay-loam surface soils with clayey subsoils. These soils are poorly to somewhat poorly drained, slowly permeable acid in the surface, and either acid or alkaline in the subsoils. The major land use is cropland (rice, cotton, and corn being the major crops) with pasture as a secondary land use.





The outcropping formation of the Pine Flats Physiographic Area is the Montgomery Terrace of the Pleistocene Series of the Quaternary System of the Cenozoic Era. Within the valley system of this area also occur the slightly younger Prairie Terrace deposits which generally form the outcropping formation of the Coastal Prairie Physiographic Area. The differences in these two formations, other than age, is primarily physiographic. The Prairie formation is characterized by a treeless plain with low relief and gentle slope, and the Montgomery formation is characterized by having a forest cover and being flat to gently rolling. Bagole--round to elliptical, swampy depressions--and Pimple Mounds are more common on the Montgomery Terrace than on the Prairie Terrace, although they occur in both formations.

The Pine Prairie Dome, an extrusive salt dome where cap rock provided a limestone quarry at one time, is located within the watershed. While there is faulting in the vicinity of the above-mentioned salt dome and at the Redell Oil Field, as well as a major fault trending east-northeast between Redell and Mamou, there is no evidence of faulting in the vicinity of the proposed dams.

Oil and gas provide the main mineral resources of the area. The limestone quarry at Pine Prairie is not in operation at the present time. There is one gravel pit in the watershed. All of the land is privately owned. However, there are several large land companies producing timber within the area. The overall land use is as follows.

Land Use	Acres	Percent
Cropland	39,925	19
Grassland	13,215	6
Woodland	150,260	70
Miscellaneous <sup>1/</sup>	10,800	5
TOTAL	214,200	100

<sup>1/</sup> Includes roads, highways, towns, farmsteads, etc.

The hydrologic cover condition of the cropland and grassland is fair. It ranges from very poor to good on the woodland.

The average annual rainfall is about 57 inches and is generally well distributed throughout the year. The minimum recorded annual rainfall is 32 inches and the maximum is 89 inches. Mean temperatures range from 82 degrees Fahrenheit in July to 51 degrees in January. The extreme recorded temperatures are 5 degrees above zero and 107 degrees above zero. The average frost-free period of 255 days extends from March 5 to November 10.

Water for human and industrial consumption is obtained from wells and is considered adequate. Water for agricultural purposes is obtained from wells,



bayous, farm ponds, and storage reservoirs. This supply is adequate for livestock needs, but a more economical source of water for irrigation is needed.

### Economic Data

The economy of the watershed depends almost entirely upon agricultural and forest products. The value per farm of all farm products sold averaged \$3,953 in 1959. Major farm enterprises are rice, cattle, sweet potatoes, and cotton. The major farm enterprises in the floodplain were at one time the same as those in the entire watershed but are now predominantly rice and cattle. The trend has been to reduce the cotton and corn acreage and increase the rice-pasture rotation, grassland, and sweet potato acreage. The potential for increased sweet potato and cattle production is excellent, and an increase in the production of these agricultural products will tend to reduce unemployed farm workers. Present plans for Evangeline Parish include the addition of four plants for processing and storing sweet potato and cattle products.

Cotton production in Evangeline Parish has decreased from 26,000 acres in 1952 to 15,000 acres in 1962. In 1955 there were eight cotton gins in the watershed. Today there are two. This decline in cotton production is expected to continue.

Rice acreage has decreased from 52,000 acres in 1952 to 43,000 acres in 1962. This decrease has been caused by acreage allotments. If allotments were removed, the rice acreage would return to the 1952 level. Most of the cropland that is used for rice production is in rice-pasture rotation. Rice lends itself to the pasture rotation system, assists in the production of cattle, and supplements the amount of improved pasture in the watershed. In the floodplain, however, landowners have not taken full advantage of the production potential of the rice-pasture rotation system due to the flood risk involved.

Full farm-family ownership in Evangeline Parish has increased from 30 percent in 1950 to 49 percent in 1959. Tenant farming has decreased from 53 percent in 1950 to 43 percent in 1959. According to the "Census of Agriculture," there were, in Evangeline Parish, 3,892 farms with an average size of 54 acres and a value of \$104 per acre in 1950. In 1959 there were 2,706 farms with an average size of 80 acres and a value of \$196 per acre. Small landowners are selling or renting their farms to larger farm units.

The reduction in farms represents a 30 percent decrease during this period, while the value per acre of farmland has increased 88 percent during the same period. The type of farming is generally rice, cattle, sweet potatoes, and cotton, in that order. In 1959, field crops accounted for approximately 80 percent of the total agricultural income, and livestock and livestock products accounted for 19 percent. In 1954, livestock and livestock products accounted for only 6 percent of the total agricultural income. Industries in Evangeline Parish primarily deal with the production and processing of oil, timber, and agricultural commodities.





Evangeline Parish has been classified as an area of chronic and persistent unemployment and underemployment through the Area Redevelopment Act. The Overall Economic Development Program for Evangeline Parish was approved by the U. S. Department of Agriculture and the U. S. Department of Commerce and Industry in late 1962. Two redevelopment projects have been recommended by the Department of Agriculture and approved by the Department of Commerce and Industry. Three additional projects have been reviewed by the Department of Agriculture and forwarded to the Department of Commerce and Industry for final approval.

According to the Overall Economic Development Program for Evangeline Parish there was, in 1962, a total labor force of 8,125. Of this number, 4,825 were agricultural workers and 3,300 were non-agricultural workers. The unemployed force was 850, of which 588 were in the semi-skilled, unskilled, and agricultural occupations. Approximately 66 percent of the unemployed were rural residents. These figures are still applicable. The average level of education in the parish is a serious problem to full employment and higher income. The median number of years of school completed for the total parish rural population is 5.7 years. This problem is generally associated with unstable conditions, high risk type farming, and low income.

The farm laborers and small, subsistence type farmers are usually unemployed during several months each year. The opportunity for this segment of the population to increase their standard of living is limited due to their lack of specialized training for other employment and the very limited number of jobs available which they can perform. The major source of other employment is located out of the parish, 50-75 miles away.

The watershed is served by approximately 315 miles of roads, of which 50 miles are paved. This road system is adequate to provide access to all farms. The unpaved roads are maintained by the parishes with enough gravel surfacing to keep them passable most of the time. Roads in the bottom lands are impassable for short periods of time because of flooding. Trails and a few roads are often impassable for extended periods during wet seasons.

The Chicago and Rock Island Railroad crosses the watershed and provides ample facilities for carload lot shipments at Turkey Creek, Pine Prairie, Reddell, and Mamou. The Missouri Pacific Railroad has similar facilities at Oakdale. Connections with other mainline tracks are available nearby.

There are approximately 12,000 people living within the watershed. Mamou, population 2,918, and Oakdale, population 6,618--on the southeast and northwest boundaries of the watershed, respectively--and Pine Prairie and Turkey Creek in the north central portion, are the only incorporated towns in the watershed. Pine Prairie and Turkey Creek each have a population of less than 1,000. There are several unincorporated communities.

The rural population will tend to stabilize as the economy improves with the installation of the project. Presently the trend is toward a population decrease in the rural sections.



The watershed affords many recreational advantages to those enjoying the outdoors. Sites for development exist along the well-traveled roads of the historically rich and scenic area.

Bobwhites, doves, rabbits, squirrels, deer, and other similar wildlife are found in most of the upland area. Ducks and geese are to be found around the rice areas in quantities sufficient to make the area attractive for this type hunting.

Forest covers 150,260 acres of the watershed. Most is in industrial ownership, although many farms have substantial amounts of their holdings in forest use. The present hydrologic condition on some 40 percent of the upland forested areas is poor. The remaining 60 percent is in fair to good condition. The forest areas have a very shallow layer of soil over a heavy clay pan.

Clear cutting, grazing, and fire have left their mark on the hydrologic and silvicultural conditions of the forest. Since these uplands have a low potential, they will need proper protection and management. This improvement potential should improve to "fair" during the installation period. Much of the forest land should develop to good and very good hydrologic conditions during the evaluation period.

More than 80 percent of the woodland is in pine and pine-hardwood types. The remaining stands generally have some pine present. Nearly one-fourth is denuded or in need of restocking. Approximately 20 percent needs planting or seeding because good seed trees are either lacking or insufficient to restock these heavily cut areas.

Site quality is generally good for pine, and well-managed stands have a substantial board foot volume of sawlog sized trees. Average merchantable volume in sawlog trees for pine and hardwood is approximately 2,750 board feet (International 1/4 Inch Rule) per acre. About 10 percent of the total growing stock is in sound, unmerchantable material, which is taking up space.

#### Land Treatment Data

The watershed is served by the Soil Conservation Service Work Units at Ville Platte and Oberlin, which are assisting the Grand Coteau Ridge Soil and Water Conservation District. These work units, through the district, have assisted 420, or about 57 percent of the 740 farms in the watershed in preparing soil and water conservation plans on 78,000 acres. Of these plans, 309 are basic conservation plans. Approximately 35 percent of the planned land treatment measures have been installed and have reduced erosion by approximately 10 percent. The Louisiana Forestry Commission, in cooperation with the U. S. Forest Service, provides landowners with assistance in fire prevention and suppression, forest management activities, forest pest control, cooperative forestation, and distribution of planting stock. Both Allen and Evangeline Parishes are under organized forest fire protection. The State is making good use of present facilities, but there is a need for more equipment so that the fire losses can be reduced to the level compatible with good watershed protection.





Forest management appears to be improving. Many farm woodlands and industrial holdings are marked prior to cutting. Some of the technical assistance is supplied by personnel of the Louisiana Forestry Commission and industrial foresters.

### WATERSHED PROBLEMS

#### Floodwater Damages

It is recognized that flood damage to woodland does occur. However, since data for evaluating damage to timbered areas due to flooding is unavailable, damages and acreages discussed in this plan represent only damages sustained to the open land acreage.

In May 1955 a storm of such magnitude that it would not be expected to re-occur more often than once in about seven years produced damages totaling \$224,177 in the watershed. The weighted rainfall for this event was 8.25 inches, and the runoff was 5.50 inches. Damages by sources were: crop and pasture, \$184,474; other agricultural, \$18,883; road and bridges, \$19,720; and non-agricultural damage, \$1,100. The total area flooded in this watershed by this storm was 14,650 acres. An additional 790 acres downstream from the watershed was flooded by runoff from this storm.

A number of farm-to-market roads cross the floodplain, and bridges span the creeks and bayous. These roads and bridges are damaged or completely destroyed by each large storm. The average annual cost of repairing or replacing these roads and bridges is \$11,169.

Crop and pasture damage is caused by the partial or complete loss of the crop, reduction of quality of crop, and additional harvesting and processing costs incurred by the landowner or operator. Average annual crop and pasture damage is \$170,084.

Other agricultural damage includes the loss of livestock or farm products, rebuilding fences or other structures, and the rehabilitation of farmland. Average annual damage from this source is \$10,530.

Non-agricultural damages include flooding to residential areas and industrial areas in the town of Mamou. Average annual damage from this source is \$840.

Flood damages were evaluated for both minor and major floods to determine average annual damages. The largest flood which is expected to occur annually will inundate 5,560 acres and will produce damages amounting to \$40,033. Floods of such intensity that they will not be expected to occur more often than once in 100 years will inundate 24,320 acres in the watershed and an additional 5,680 acres downstream below the watershed and produce damages amounting to \$545,317. From these evaluations, the frequency method was used to determine average annual damage and damage reduction.



With the flooding at the present intensity, landowners in the floodplain are unwilling to intensify production of supplemental crops. With the project in place and the flooding reduced to the agreed-upon level, landowners will intensify their supplemental pasture program through seed-ing and fertilizing their rice-pasture rotation acreage.

### Erosion and Sediment Damages

Sheet erosion is the chief form of soil loss present in the upland section of the watershed. Some roadside erosion is found but is minor when considering the total sediment yield. Good land management and reforestation have reduced erosion to a minimum. Streams appear to be aggrading rather than eroding.

Scour holes and multi-channels in the floodplain indicate the presence of some erosion; but since this area has low value hardwoods as its cover, monetary damages are slight. The aggrading channels probably influence the rate of flooding to some extent, but major sediment damage to these channels probably occurred prior to modern times.

One irrigation reservoir is being damaged from sediment deposits. This reservoir is rather large and is used for irrigation and recreation. Approximately 10 acre-feet of storage capacity per year is being lost.

### Problems Relating to Water Management

Approximately 42,885 acres of cropland and pasture is in the flatland portion of the watershed. Damages in this area which result from flood-water and from insufficient agricultural water management are inseparable. Group channels are insufficient to remove excess runoff. Bayou Nezpique is inadequate for the timely removal of this excess water.

With the present land use and the types of crops grown, irrigation plays a major role in production. Rice is an extremely heavy user of irrigation water, and sweet potatoes also need some irrigation when planted.

Approximately 65 percent of the irrigation water used in this watershed is obtained from the Chicot underground reservoir. This reservoir is in Southwest Louisiana and is defined as being that group of interconnecting sands and gravels found at the base of the Pleistocene deposits. It is the largest source of irrigation water for most of southwestern Louisiana. Recharge is accomplished in several areas, the largest of which is immediately northwest of the rice farming area where the aquifers crop out. The southern boundary of this recharge area trends southeasterly across Beauregard Parish to the vicinity of Kinder in Allen Parish, and then northeastward into Evangeline Parish to the headwater area of Cypress Creek, covering an area of some 2,000 square miles. Where the beds of sand and gravel are exposed at the land surface, much of the rainfall finds its way into the aquifer. This area is the source of at least 85,000 acre-feet of recharge annually. The Calcasieu River, Atchafalaya River, and the Vermilion River also supply recharge to the reservoir.





The maximum annual withdrawal by wells from the Chicot Reservoir is estimated to be 890,000 acre-feet. This withdrawal, together with reduced recharge, has caused the water surface to decrease steadily for over 50 years. The decline in water surface area causes a reduced amount of water to be available, or greatly increases the pumping cost to obtain a given quantity of water. Well owners in south central Evangeline Parish are experiencing a critical decrease in the yields of irrigation water from these wells. Also, salt water has intruded into this aquifer from the Gulf of Mexico and has increased the salinity in certain areas to the point where the water can be used only as an emergency supply. The following chart shows the elevation of the top of the water in the spring and in the fall at points near Ville Platte and near the south central boundary of Evangeline Parish.

#### Elevation of Top of Water Surface

: Spring :		: Fall :		
Year:	Southern Boundary:	Near Ville Platte:	Southern Boundary:	Near Ville Platte
1903	+30	-	-	-
1944	+20	+ 5	+20	-10
1945	-	-	+15	-10
1946	+ 5	-	+20	-10
1947	+20	-25	+ 5	-30
1948	+15	- 5	- 5	-30
1949	+ 5	-10	0	-30
1950	+ 5	-10	+ 5	-20
1951	+10	-10	- 5	-30

A more dependable supply of fresh water is needed for the irrigation of riceland adjacent to Bayou Nezpique. Farmers adjacent to this stream attempt to irrigate 2,174 acres of rice from this source. However, they must obtain supplemental water from deep wells or from commercial water suppliers. The expense incurred by landowners in obtaining this supplemental water amounts to 20 to 25 percent of the crop to be irrigated. During dry periods, commercial suppliers cannot take care of the demand.

In 1964 the Farmers Home Administration made \$48,000 available to landowners in the form of emergency type production loans. These loans are available to farmers only after it is determined that they have suffered a natural disaster resulting from excess rain or drought, thereby reducing their net income.

Drinking water for deer and other wildlife is limited in the upland areas of the watershed. Bayou Nezpique ceases to flow during periods of extended drouth.

There are presently no facilities within the watershed for enjoying water-based recreation such as picnicking, swimming, boating, skiing, and similar sports. Only a very limited opportunity exists for fishing and hunting. Persons who wish to enjoy these water related recreational activities must travel many miles to reach an adequate facility. Chicot Park, a





recreational area about 20 miles distant where boating, fishing, camping, picnicking, and sight-seeing can be enjoyed, is operated by the Louisiana Parks Commission. It is limited in size and is seriously overcrowded most of the time. Millers Lake, a privately owned irrigation storage reservoir, is located within the watershed area and is open to public fishing and hunting. However, it is not suitable for other types of recreation.

The present population within a 30-mile radius is estimated to be 145,600 persons. This is expected to increase to 174,000 by 1980. The local sponsors have indicated a keen interest in development of additional recreational areas within the watershed.

#### PROJECTS OF OTHER AGENCIES

Some attempts have been made by local interests to prevent or control flooding in the watershed. About a decade ago a few miles of the main channel of Bayou Nezpique was straightened. Similar work was done on the east fork of Bayou Nezpique below Millers Lake. Bayou Grand Louis and Manwell Gulley were improved. Few benefits were derived from this work due to the piecemeal approach which was taken, and time has reduced the capacity of these enlarged channels.

There has been considerable interest in improving the Mermentau River for flood control and water management. Future plans may include some work in this area, which is below the watershed. This work plan does not include any features which would have adverse effects on any probable improvements for the Mermentau River.

The parishes which adjoin Bayou Nezpique between the lower end of this watershed and the Mermentau River have expressed a desire that this reach of the stream be improved. The Louisiana Department of Public Works has agreed to improve this reach, and it is expected this work will begin in 1967.

There are no existing or proposed works of improvement of any other agencies which would affect or be affected adversely by the measures included in this plan.

#### BASIS FOR PROJECT FORMULATION

The local people recognize the need for a comprehensive approach to the watershed problems. This plan is a revision of an original watershed work plan approved for operations in August, 1957. The original work plan did not become operational because the Grand Coteau Ridge Soil Conservation District, the sponsoring local organization, could not obtain needed land, easements, and rights-of-way. Since that time, the Evangeline Parish Police Jury and the Allen Parish Police Jury have become co-sponsors; and the local people have voted to tax themselves to pay for needed land, easements, rights-of-way, and their portion of costs for installation, operation, and maintenance. When the sponsors requested a revision of the work plan, they also requested that recreation and agricultural water management for drainage and irrigation be included as project purposes. They requested a



study to determine if increased flood protection could be afforded above that proposed in the original work plan.

Watershed protection, flood prevention, water management needs, and recreation developments were discussed and reviewed with local sponsors and other interested groups, including representatives from county, State, and Federal agencies.

Evangeline Parish is an area of chronic and persistent unemployment. The additional employment opportunities that will be provided through the installation of this project and its operation and maintenance will help to offset unemployment.

The local sponsors, the Department of Public Works, and the Soil Conservation Service agreed that the plan would:

1. Include land treatment measures, based on current needs, which can be applied during the project installation period and which contribute directly to watershed protection, flood prevention, and agricultural water management.
2. Provide sufficient water for the supplemental irrigation of 2,174 acres of cropland adjacent to Bayou Nezpique, which can be irrigated economically from this bayou.
3. Provide about a 2-year level of protection to those flatland agricultural areas where damages from floodwater and inadequate agricultural water management are inseparable.
4. Reduce average annual agricultural and non-agricultural floodwater damages approximately 50 to 60 percent in the agricultural floodplain of Bayou Nezpique.
5. Provide a recreational development for the watershed.
6. Provide the maximum feasible protection for fish and wildlife resources.

Four different combinations of floodwater retarding structures, with and without stream channel improvement, were studied before developing a plan that would meet the project objectives. These studies showed that without Sites 13, 14, 15, and 16 and channel improvement in place, considerable flooding occurs in the lower reaches of Bayou Nezpique and Bayou Grand Louis. The inclusion of these four structures and channel improvement is necessary for the proper function of the other structural measures and to meet project objectives. The most feasible plan which meets project objectives was determined to be (a) the application of needed land treatment measures; (b) the construction of 14 single-purpose flood prevention structures, 1 multiple-purpose flood prevention and irrigation water storage reservoir, and 1 multiple-purpose flood prevention and recreation reservoir; (c) the construction of about 2,200 feet of floodway; (d) the improvement of about 61 miles of stream channels through the agricultural areas; and (3) the construction of minimum basic facilities for enjoyment of water-based recreation.





Field studies with the Soil Conservation Service biologist were made at the various retarding structure sites to determine the advisability of storing water permanently in the sediment pools. Sites 1, 2, 4, 8, 9, 10, 12, 13, 14, 15, and 16 will store shallow water only. It was determined that these sites would be marginal for fish production and aquatic weed growth would be troublesome. Therefore, they should be designed as "dry pools."

#### WORKS OF IMPROVEMENT TO BE INSTALLED

##### Land Treatment Measures

The Grand Coteau Ridge Soil and Water Conservation District has been assisting landowners in the application of basic conservation programs on the farms of the watershed for many years. This program, based on the use of each acre of agricultural land within its capabilities and its treatment in accordance with its needs for present and future production, is essential in a sound and continuing agricultural water management program.

Basic to the attainment of this objective is the establishment of all applicable soil and water conservation and plant management practices. The extent of needed land treatment measures which have been applied represents an expenditure of approximately \$1,095,292 by landowners and operators within the last 10 years. Table 1A shows the measures which have been installed.

Table 1 includes estimates of the acreage in each major land use which should receive accelerated land treatment during the 10-year installation period. These measures will be established and maintained by the landowners and operators in cooperation with the going district programs. In addition to the presently available technical assistance, \$156,334, will be made available from Public Law 566 funds to accelerate the establishment of these practices and measures. This amount includes \$42,017 for the completion of soil surveys at an early date.

In order to bring about betterment of the forest land, hydrologic stand improvement will be installed on 10,000 acres. This measure consists of eradication of low value trees on selected sites to favor the better species. This will be accomplished by planting some 3,000 acres of open land and understocked forest land. Slash pine is recommended for much of this planting, but other suitable species can be used. An additional 2,000 acres of the upland will be direct-seeded to longleaf pine and later released by eradication of the overtopping, low value species.

Landowners will be encouraged to interplant these reforested areas with selected hardwood tree species to insure native wildlife habitat.

So that livestock do not disturb some of the recent tree plantings or seeded areas, about 20 miles of fencing will be installed. This will give the new areas a chance to develop good forest floor conditions, as well as allow survival of other growing stock.

The fire protection program will be strengthened by the addition of fire towers, tractors, plows, and trucks with radio equipment.





In this watershed the trend in upland farm areas is toward retirement of rolling or eroded cultivated areas, particularly small fields, to grass-land or trees. Land treatment measures which will be installed on the presently unprotected cultivated land include 45 miles of gradient or parallel terraces, 2,200 acres of conservation cropping system, 1,560 acres of cover and green manure crops, and 2,420 acres of crop residue use. About 4,500 acres of permanent pasture will be renovated and re-established to a base grass and clover. Brush and weed control and proper use will be practiced on 5,100 acres of established pasture lands. Landowners will be encouraged to establish wildlife plantings along field borders, in specially selected sites, and in eroded areas to furnish cover and food for wildlife. These measures will improve the watershed protection characteristics of the area and produce additional farm income.

On the flat land areas, which include the floodplain and the areas where agricultural water management is a problem, cover crops will be established on 5,500 acres and conservation cropping systems will be established on 9,800 acres. Grass and legumes in rotation will be established on 2,500 acres and crop residue management will be practiced on 8,500 acres. These measures will afford protection from erosion and maintain high productivity. About 1,100 acres of permanent pasture will be renovated and re-established to a base grass and clover. Brush and weed control and proper use will be practiced on 1,250 acres of established pasture lands.

Bedding, land smoothing, land leveling, land grading, and other measures required for the proper and timely removal of excess water will be installed on approximately 30,000 acres.

The installation of all land treatment measures will reduce the total annual gross erosion in the watershed by approximately 8 percent. Terraces will slow the runoff from cultivated fields, and increased grass cover will utilize a maximum amount of water from flood-producing storms.

### Structural Measures

Structural measures to be installed in accordance with this plan include 14 single-purpose flood prevention structures; 1 multiple-purpose flood prevention and recreation structure; 1 multiple-purpose flood prevention and irrigation water storage structure; 2,200 feet of floodway for flood prevention; 1 recreation area with minimum basic facilities; and about 61 miles of stream channel improvement, which serves both flood prevention and agricultural water management.

The drainage area that will be controlled by the 14 single-purpose and 2 multiple-purpose dams is approximately 147 square miles, or about 44 percent of the total area in the watershed. Provision is made in all the flood prevention structures for the storage of the expected accumulation of 100 years of sediment. Permanent water may be stored in Sites 6, 7, and 11 to the elevation of the 50-year sediment accumulation; in Site 3 to the elevation of the recreation pool; and in Site 5 to the elevation of the irrigation storage pool. Due to the shallow nature of the sediment pools in Sites 1, 2, 4, 8, 9, 10, 12, 13, 14, 15, and 16, they will be operated as dry sediment pools. Land clearing on these sites will be limited to the



vicinity of the dam. This will remove a minimum amount of land from the wildlife habitat areas.

The 16 structures will have an aggregate capacity of 67,086 acre-feet. This includes 8,057 acre-feet of irrigation storage, 1,415 acre-feet of water for recreation; 2,867 acre-feet for sediment; and 54,747 acre-feet of floodwater detention. The floodwater which may be retarded is equivalent to approximately 7 inches of runoff from the entire controlled area.

Each site in which permanent water is to be impounded will have a means of drawing down the permanent pool for mosquito control and a drain valve in the principal spillway. In addition to mosquito control, these devices will permit water fluctuations as necessary for weed control, fish and wildlife management, and the means to discharge water for beneficial purposes downstream. The landowners will be encouraged to stock these pools with game fish to provide fishing opportunities in the upper portion of the watershed.

Minimum basic recreational facilities will be installed on an area adjacent to Site 3 (figure 7). These facilities will include access roads, parking areas, a boat launching ramp, boat docks for the safe loading and unloading of passengers, a supply of fresh water, sanitary facilities, a beach area, picnicking and camping sites, and shelters for protection of visitors from sudden thunder showers. About 100 acres will be needed for the installation of this recreational area. A schedule of the proposed facilities is shown in table A. The estimated installation cost of the recreational facility is \$366,646.

The recreation pool in Site 3 will have a water surface area of about 430 acres and will average 3.5 feet deep; however, at least 100 acres will have water 5 feet deep or more. The dam, spillway, and appurtenant works will require 25 acres; and an additional 1,045 acres will be needed for detention and surcharge storage. Total storage in this site is 4,460 acre-feet, of which 1,415 acre-feet is for recreation; 2,902 acre-feet is for floodwater retardation; and 143 acre-feet will be for sediment. The estimated installation cost of Site 3 is \$392,406.

Site 5 will store 13,444 acre-feet, of which 8,057 is for storage of irrigation water, 4,810 acre-feet is for floodwater retardation, and 577 acre-feet is for sediment. The average annual runoff, or dependable water yield, from the approximate 9,600 acre drainage area above this structure is 20 inches. This is adequate to replenish water used for irrigation each year. The outlet works of the reservoir will be designed to be manually operated so that the structure can furnish maximum irrigation water for downstream use. When water is released from this site for irrigation purposes, the upper reaches of the pool will be exposed. In order to more fully utilize this area, local landowners will be encouraged to plant or establish waterfowl foods on this exposed area. When these planted areas are again flooded by recharge rainfall, these areas will make ideal resting and feeding areas for waterfowl. The estimated installation cost of Site 5 is \$936,503.





No channel improvement is planned in the immediate vicinity of an existing large irrigation storage lake referred to locally as "Millers Lake." Headward erosion of a channel in this area, which could be expected, would endanger the existing dam on this privately owned lake. Approximately 2,200 feet of floodway will be constructed immediately below this lake to confine the flood flows and return them to the channel which will be improved to the lower end of the floodway (figure 6). The floodway is a single-purpose flood prevention measure. The estimated cost is \$31,236.

Existing drainage systems will be disrupted by the construction of the floodway and channel improvement. These disrupted drainage systems (approximately 1.25 miles) will be rebuilt as part of the construction cost. However, they will be allocated entirely to agricultural water management. The estimated cost of reconstructing the disrupted drainage systems is \$20,464.

Sites 1, 2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16 are single-purpose flood prevention structures. The total capacity of these structures is 49,182 acre-feet, of which 2,147 acre-feet is for sediment and 47,035 acre-feet is for floodwater retardation. The estimated installation cost of these structures is \$3,771,919.

Bayou Nezpique will be improved by enlargement and channel alignment from a point near the lower end of the floodway at Millers Lake to a point about one mile below Louisiana State Highway No. 10. It will be improved by clearing and shaping from this point downstream to the southern end of the watershed. Additional channels as shown on the Project Map will be improved. The total amount of channel improvement is about 61 miles. These channels will serve both flood prevention and agricultural water management. The capacity of the channels has been designed to provide about a 2-year level of flood protection. The estimated installation cost of channel improvement is \$769,061.

The details of the quantities, costs, and design features of all measures are shown in tables 1, 2, 3, 3A, and 3B.

#### EXPLANATION OF INSTALLATION COSTS

The total installation cost of the project is estimated to be \$8,443,207, of which \$4,445,248 will be paid from Public Law 566 funds and \$3,997,959 will be borne by other funds. Included in this total cost are land treatment measures, \$2,154,972, and structural measures, \$6,288,235. The cost of installing land treatment measures will be shared \$166,334 by Public Law 566 and \$1,988,638 by other funds. These other funds include services and labor by landowners and operators, cost sharing by the Agricultural Conservation Program, and assistance from other going programs.

The costs of installing the land treatment phase of the program were developed by the Grand Coteau Ridge Soil and Water Conservation District, the Soil Conservation Service, the U. S. Forest Service, and the Louisiana Forestry Commission. The technical assistance costs are based on the present cost of the going programs. The measure installation costs are





based on present prices paid by landowners or operators to establish individual measures in the locality. The amount of land treatment needs to meet project goals is based on field surveys, conservation needs inventories, and discussions with agricultural workers and landowners in the area.

The Soil Conservation Service and the Grand Coteau Ridge Soil and Water Conservation District will provide technical assistance valued at \$97,175 during the 10-year installation period. The Louisiana Forestry Commission, in cooperation with the U. S. Forest Service, will provide technical assistance valued at \$12,500 to install the forest land treatment measures. An additional \$10,000 of Public Law 566 funds and \$10,000 of State funds will be used to purchase equipment to strengthen the fire protection program. In order to accelerate installation of land treatment measures, Public Law 566 will provide \$156,334 for technical assistance, of which \$42,017 is for the completion of standard soil surveys and \$104,317 is for the acceleration of technical assistance during the installation period.

The installation of land treatment measures and the need for accelerated technical assistance will increase as the project is developed. This installation should be at its peak during the sixth year and taper off after that. The proposed schedule for the installation of these measures and necessary technical assistance is as follows.

#### Schedule of Obligations - Land Treatment Measures

Fiscal Year	Measures	P. L. 566 Funds (dollars)	Other Funds (dollars)	Total (dollars)
1st	Land Treatment	-	101,940	101,940
	Technical Assistance	13,800 <sup>1/</sup>	10,968	24,768
	Soil Surveys	42,017 <sup>2/</sup>	-	42,017
2nd	Cooperative Forest Fire Control	10,000	10,000	20,000
	Land Treatment	-	135,920	135,920
	Technical Assistance	7,730	10,967	18,697
3rd	Land Treatment	-	169,900	169,900
	Technical Assistance	9,670	10,968	20,638
4th	Land Treatment	-	203,880	203,880
	Technical Assistance	11,600	10,967	22,567
5th	Land Treatment	-	237,860	237,860
	Technical Assistance	13,530	10,968	24,498
6th	Land Treatment	-	271,840	271,840
	Technical Assistance	15,460	10,967	26,427

(continued next page)



## Schedule of Obligations - Land Treatment Measures (continued)

Fiscal Year :	Measures	: P. L. 566 : : Funds :	Other : : Funds :	Total
		(dollars)	(dollars)	(dollars)
7th	Land Treatment	-	237,860	237,860
	Technical Assistance	13,530	10,968	24,498
8th	Land Treatment	-	203,880	203,880
	Technical Assistance	11,600	10,967	22,567
9th	Land Treatment	-	169,900	169,900
	Technical Assistance	9,670	10,968	20,638
10th	Land Treatment	-	135,983	135,983
	Technical Assistance	7,727	10,967	18,694
	Totals	166,334	1,988,638	2,154,972

1/ Includes \$8,000 previously spent.

2/ Work completed.

NOTE: Total accelerated technical assistance to install needed land treatment measures in installation period is \$148,334. Since 1957 plan was approved for operations, \$8,000 has been spent on accelerated technical assistance. Therefore, total accelerated needs are \$156,334.

Land, easements, and rights-of-way for all planned structural measures will be obtained by the local sponsors. Public Law 566 funds will be used to reimburse the local sponsors for 50 percent of the cost of land, easements, and rights-of-way for the multiple-purpose flood prevention and recreation structure (Site 3) and the associated recreational development.

The total estimated cost of installing the 14 single-purpose flood prevention structures is \$3,771,919, of which \$2,722,967 will be paid by Public Law 566 and \$1,048,952 will be paid by other funds. The Public Law 566 share is \$2,019,270 for construction and \$703,697 for installation services. The share to be paid by other funds is \$1,034,952 for land, easements, and rights-of-way, including the value of the land, legal fees, and removal, relocation, or reconstruction of existing facilities, and \$14,000 for contract administration.

The total estimated cost of installing the multiple-purpose flood prevention and irrigation water storage structure (Site 5) is \$936,503. Public Law 566 will pay \$555,216, of which \$370,678 is for construction and \$184,538 is for installation services. Of the \$381,287 to be paid by other funds, \$158,862 is for construction; \$217,425 for land, easements, and rights-of-way; and \$5,000 for contract administration. The "Use of Facilities" method was used to allocate these costs to purposes.

The total estimated cost of installing the multiple-purpose flood prevention and recreation structure (Site 3) is \$392,406, of which \$270,787 is





to be paid by Public Law 566 and the remaining \$121,619 is to be paid by other funds. Of the portion to be borne by Public Law 566 funds, \$158,851 is for construction; \$86,786 is for installation services; \$21,400 is for one-half the estimated value of land necessary for the facility; and \$3,750 is for one-half the estimated cost of modification of existing facilities. Of the portion to be borne by other funds, \$90,189 is for construction; \$21,400 is for one-half the estimated value of land necessary for the facility; \$4,280 is for legal fees; \$3,750 is for one-half the estimated cost of modification of existing facilities; and \$2,000 is for contract administration. The cost of this structure is allocated to purposes on the basis of the "Alternative Justifiable Expenditure" method of cost allocation.

The total estimated cost of installing the minimum basic facilities is \$366,646, of which \$182,373 is to be paid by Public Law 566 and \$184,273 is to be paid by other funds. Of the portion to be borne by Public Law 566 funds, \$133,760 is for construction; \$46,613 is for installation services; and \$2,000 is for one-half the estimated value of land necessary for the facility. Of the portion to be borne by other funds, \$133,760 is for construction; \$46,613 is for installation services; \$2,000 is for one-half the estimated value of land necessary for the facility; \$400 is for legal fees, which includes property surveys, appraisals, etc; and \$1,500 is for contract administration.

A portion of the stream channel improvement is in areas where the flood prevention and agricultural water management problems are inseparable. Where this condition exists, all costs are allocated between these two purposes in accordance with standard procedures, which results in 50 percent of the cost being allocated to flood prevention and a like amount to agricultural water management. These channels are designated on the Project Map as L-1E, L-1E1, L-1E1A, L-1F, L-1H, L-1H1, L-1H2, L-1J, L-1K, L-1L1, L-1L2, L-1L3, and L-1L5. The total estimated cost of improvement on these channels is \$213,389, of which \$87,225 is to be paid by Public Law 566 and \$126,164 is to be paid by other funds. Of the portion to be paid by Public Law 566, \$59,553 is for construction and \$27,672 is for installation services. Of the portion to be paid by other funds, \$19,850 is for construction; \$104,714 is for land, easements, and rights-of-way, including value of land, legal fees, and removal, relocation, or modification of existing facilities; and \$1,600 is for contract administration.

The remaining channels serve both wet and non-wetland. Where this condition exists, a proportion of the cost of channel improvement equal to the ratio of the area of non-wetland to the total area served by the channel was allocated to flood prevention, and the remainder of the cost was allocated equally to flood prevention and agricultural water management. For the purpose of this allocation, any area served by the multiple-purpose channel which now has or may require on-farm drainage ditches or subsurface drains was classed as wetland and was not included in the area of non-wetland used to determine the ratio of costs allocated to flood prevention. Non-wetlands averaged 81.3 percent of the area being served, and wetlands averaged 18.7 percent of the area being served. The channels serving these areas are designated on the Project Map as L-1C, L-1A2, L-1A1, L-1A, M-1,





L-II, L-II1, and L-II'A. The total estimated cost of installing the improvement on these channels is \$555,672, of which \$418,379 is to be paid by Public Law 566 and \$137,293 is to be paid by other funds. Of the portion to be paid by Public Law 566 funds, \$302,214 is for construction and \$116,165 is for installation services. Of the portion to be paid by other funds, \$31,126 is for construction; \$99,767 is for land, easements, and rights-of-way, including value of land, legal fees, and removal, relocation, or modification of existing facilities; and \$6,400 is for contract administration.

The total estimated cost of installing the stream channel improvement is \$769,061, of which \$505,604 is to be paid by Public Law 566 and \$263,457 is to be paid by other funds. Of the portion to be paid by Public Law 566, \$361,767 is for construction and \$143,837 is for installation services. Of the portion to be paid by other funds, \$50,976 is for construction; \$204,481 is for land, easements, and rights-of-way, including value of land, legal fees, and removal, relocation, or modification of existing facilities; and \$8,000 is for contract administration.

The total estimated cost of installing the floodway is \$31,236, of which \$29,284 is to be paid by Public Law 566 funds and \$1,952 is to be paid by other funds. Of the portion to be paid by Public Law 566 funds, \$21,716 is for construction and \$7,568 is for installation services. Of the portion to be paid by other funds, \$1,452 is for land, easements, and rights-of-way, including value of land and legal fees; and \$500 is for contract administration.

The total installation cost of rebuilding the disrupted drainage systems is estimated to be \$20,464. Of this total, \$12,683 is to be paid by Public Law 566 funds and \$7,781 is to be paid from other sources. Of the portion to be paid by Public Law 566 funds, \$7,472 is for construction and \$5,211 is for installation services. Of the portion to be paid by other sources, \$7,472 is for construction; \$209 is for land, easements, and rights-of-way; and \$100 is for contract administration. This entire cost is allocated to agricultural water management.

All construction costs include a 10 percent contingency allowance. The engineer's estimates were based upon previous construction cost of structures with similar construction conditions, then adjusted to reflect local conditions. Installation services costs are based upon Service experience, and include the cost of detailed geologic investigations for each site.

The value of the land needed for project installation was estimated by the local sponsors, as was the cost that will be required for the removal, modification, or relocation of the existing facilities. The agency or company responsible for the operation or maintenance of roads, railroads, pipelines, and other facilities that will be disrupted were contacted to determine the adequacy of the estimates.

The proposed schedule of obligations for the 5-year installation period for the structural measures is shown in the table below. These costs may be



adjusted from year to year as mutually agreed to and based on appropriations and accomplishments actually made.

Schedule of Obligations - Structural Measures

Fiscal :		: Public	:	:
Year :	Measures	: Law 566	: Other	: Total
		(dollars)	(dollars)	(dollars)
1st	Installation Services	306,216	-	306,216
	Land, Easements, and Rights-of-way	25,150	371,612	396,762
	Construction - Sites 1, 3, 6, 7, 8, 9	895,851	90,189	986,040
	Contract Administration	-	7,000	7,000
2nd	Installation Services	306,216	23,306	329,522
	Land, Easements, and Rights-of-Way	2,000	574,532	576,532
	Construction - Sites 2, 5, 10, 11	817,058	158,862	975,920
	Minimum Basic Facilities	133,760	133,760	267,520
	Contract Administration	-	7,000	7,000
3rd	Installation Services	282,909	23,307	306,216
	Land, Easements, and Rights-of-Way	-	388,601	388,601
	Construction - Sites 4,12,13,14, 15, 16	835,890	-	835,890
	Bayou Nezpique Floodway and Disrupted Drainage Facilities	278,379	33,451	311,830
	Contract Administration	-	7,000	7,000
4th	Installation Services	182,909	-	182,909
	Land, Easements, and Rights-of-Way	-	155,604	155,604
	Construction - All Remaining Channels	112,576	24,997	137,573
	Contract Administration	-	5,100	5,100
5th	Installation Services	100,000	-	100,000
	Contract Administration	-	5,000	5,000
	Total	4,278,914	2,009,321	6,288,235

EFFECTS OF WORKS OF IMPROVEMENT

A storm that occurred in May 1955, which was of an intensity that would not be expected to reoccur more often than once in 7 years, produced a weighted rainfall over the watershed of 8.25 inches and 5.50 inches of runoff. This storm inundated, exclusive of all woodland, 15,440 acres of crop and pasture land. Had the structures been in place and functioning, this acreage would have been reduced to 7,060 acres.





Under present conditions, a storm of 1.8 percent chance occurrence (57-year frequency) would inundate 26,590 acres of crop and pasture land. With this project in place, this storm would inundate 15,950 acres. This storm, with project installed, would cause the same damages as are now caused by a storm of 7-year frequency.

The following chart compares the damages which actually occurred during the storm of May 1955 with the damages which would have occurred had the project been installed. It also shows the damages which will occur under present conditions and the damages which would occur under project conditions for a storm of 1.8 percent chance occurrence.

Type Damage	: May 1955 Storm		: 1.8 Percent Chance Storm	
	: Present	: With	: Present	: With
	: Conditions	: Project	: Conditions	: Project
(dollars)				
Crop and Pasture	184,474	83,624	348,731	193,965
Road and Bridge	19,720	9,016	54,316	32,570
Other Agricultural	18,883	8,389	32,520	18,953
Non-Agricultural	1,100	501	7,239	4,338
Total	224,177	101,530	442,806	249,826

Damages from flooding cannot be completely eliminated in the watershed by the project. Acreage inundated under present conditions will be reduced by 50 to 60 percent with the project installed. Other damages will be reduced by approximately the same amount. The acreage that will still be inundated after project installation will be inundated to a lesser depth and for a shorter duration. Land treatment measures will account for approximately 3 to 4 percent of the reduction in acreage flooded.

The floodplain in this watershed is all the land that is inundated from a storm that will not be expected to occur more often than once in 100 years, except the low-lying wooded areas adjacent to the bayous and streams. These areas flood several times each year and were not considered as part of the floodplain for evaluation purposes. The floodplain totals 30,000 acres, of which 5,680 acres are outside of the watershed.

Under present conditions, approximately 15,400 acres of the floodplain are inundated by a storm that could be expected to occur once in 7 years. This includes 14,610 acres in the watershed and 790 acres outside of the watershed. With land treatment measures installed, the 15,400 acres will be reduced to 14,820. With structural measures installed, the total area flooded will be 7,060 acres, of which 310 acres are outside of the watershed. Landowners of the 7,760 acres which have flood-free protection from a 7-year event have indicated that the reduction of flooding will allow them to intensify their production through improved cultural practices and reduced risks.





After installation of the project, other agricultural damage in the form of fence repair, additional feeding costs of cattle, and livestock losses will be greatly reduced. This reduction in other agricultural damage will enable the landowners to invest the savings toward the intensification of the above mentioned acreage without any additional expenditures.

After installation of the project, damage to roads and bridges in the floodplain will be greatly reduced. This will enable the parish to maintain roads in better conditions, and will release funds from repair of damage to use for road and bridge improvement. As a result, transportation in the watershed will be much improved.

Erosion does not constitute a serious problem; however, land treatment measures will reduce the present amount of erosion by approximately 8 percent. The primary area on which sediment damage occurs is Millers Lake. This lake is used primarily as a reservoir for rice irrigation water. The present average annual deposition of sediment into Millers Lake is 10 acre-feet. Following project installation the annual deposition will be 8 acre-feet. This reduction in sediment will increase the life of the lake and afford the landowners additional rice irrigation water.

The retarding structures, combined with the land treatment measures, will reduce the amount of sediment deposited in the channels in the watershed and thereby reduce the annual maintenance cost associated with them. Landowners who have land joining Bayou Nezpique have, for many years, used the available water in the bayou to irrigate their rice fields. At present there are 17 landowners irrigating approximately 2,174 acres from this source. All of these landowners are forced to supplement this water by pumping from deep wells or purchasing water from other sources. With the installation of this project the landowners now irrigating out of Bayou Nezpique will be allowed to produce their crops with reduced risk and at a lower production cost.

There are approximately 34,000 acres on about 500 farms that will benefit from agricultural water management. These farms are generally located to the east and south of Bayou Nezpique and in the Mamou, Redell and Pine Prairie area. About 95 percent of these farms are family farms, each of which hire less than one and a half man-years of labor each year. Local interests and drainage districts have tried to maintain the main channels in the watershed in operating condition; however, local landowners have installed more than 2,300 miles of field and lateral ditches on farms within the last 10 years, overtaxing the outlets and thereby affecting all of the land that is attempting to obtain proper agricultural water management. The installation of this project will enable the family-size farms to maintain their normal level of production, allow planting on time, reduce the risk of replanting, and reduce production and harvesting costs. This project will also enable landowners to more efficiently utilize their labor and managerial ability. The degree of protection afforded landowners will meet project goals.



The installation of the recreational development adjacent to Site 3 will provide the people in the watershed and the surrounding area with facilities to enjoy fishing, swimming, boating, skiing, hunting, picnicking, camping, and other outings. It is estimated that within 15 years more than 35,000 people annually will visit this area. Facilities will be provided to accommodate approximately 1,200 to 1,500 persons on any given day. Peak use is expected to be between mid-May and mid-September of each year.

Additional employment opportunities will be provided during project installation and from operation and maintenance of works of improvement. It is estimated that these benefits will total \$17,430 annually. Some additional opportunities will stem from the use of the project improvements such as the recreation facilities and the additional facilities required to process crops produced by attaining normal yields. The local sponsors were unable to evaluate these benefits at this time, and no benefits from this source were claimed. However, the local sponsors feel that the project installation will be of major importance in reducing the number of unemployed or underemployed people in the watershed.

Fish and wildlife resources will benefit from the additional water facilities made available through the five permanent pools created. This additional water will be valuable to deer in the upper reaches of the watershed where streamflow occurs only during storm runoff. Landowners will be encouraged to install wildlife habitat development areas and wildlife wetland development areas.

The economic level of the people in the watershed and on the farms will have a direct relationship to the savings brought about by the flood prevention, reduction in production and harvesting costs, and the increased income due to the increased quality of production. This additional income will be reflected as increased purchasing power of the people and will have an effect on the economic level of the community.

#### PROJECT BENEFITS

Direct primary benefits are estimated to equal \$269,512 annually. Of this amount, flood prevention benefits amount to \$152,520 and include \$112,755 from damage reduction and \$39,765 for more intensive land use. Agricultural water management benefits amount to \$46,312, of which 11,426 is increased efficiency and \$34,886 is irrigation, and include \$36,905 from reduced production costs, \$6,669 from increased prices received as a result of improved quality, and \$2,738 for more intensive land use. Recreation benefits amount to \$53,250. The average annual benefits accruing to redevelopment are expected to be \$17,430. These benefits will accrue from the local labor used in the installation of structural measures and with additional operation and maintenance required with the installation of the project.

Secondary benefits stemming from the project in the form of increased net returns were evaluated. Benefits induced by the project in the form of increased production expenditures were also evaluated. Local benefits





accruing annually to the project from these sources are expected to be \$48,618. Secondary benefits from a national viewpoint were not considered pertinent in the economic evaluation. The project will provide other benefits that were not included for project justification. Among these are the increased economic activity in the watershed and neighboring towns and the greater sense of economic security by people living in the area.

The proposed land treatment measures and continued fire protection will improve the hydrologic condition and productivity of the cropland, pasture and forest land in the watershed.

#### COMPARISON OF BENEFITS AND COSTS

Average annual primary benefits from structural measures are estimated to be \$269,512. The average annual cost of structural measures (amortized installation cost plus operation and maintenance) is estimated to be \$248,698, providing a benefit-cost ratio of 1.1 to 1. Total average benefits (including secondary benefits) from structural measures are estimated to be \$318,130, producing a benefit-cost ratio of 1.3 to 1.

#### PROJECT INSTALLATION

The project is to be carried out over a 10-year period. The structural measures will be completed within 5 years, and the land treatment measures will be completed within 10 years. The sponsoring local organizations understand their obligations and have agreed to carry out the work to be done during the installation period.

The Louisiana Department of Public Works has agreed to improve Bayou Nezpique from the lower end of this watershed to U. S. Highway #190. No work will be done on Bayou Nezpique within this watershed under this plan until the Department of Public Works improves this section.

Some technical assistance in the planning and application of forest land treatment measures is provided under the going cooperative forest management program. Additional technical assistance for accelerating the installation of the forestry measures will be provided by the Louisiana Forestry Commission, in cooperation with the U. S. Forest Service. The forester assigned to this project will assist and guide the landowners in the installation of the forestry measures planned for each watershed.

Land treatment measures will be installed as soon as possible following installation of necessary structural measures. Installation of these measures and their maintenance will be outlined with each individual landowner. The agreed-to items will be identified in a conservation plan executed between the individual and the soil and water conservation district serving the area. Accelerated technical assistance to the districts will be made available through Federal funds in order to complete this work within the 10-year installation period. The Grand Coteau Ridge Soil and Water Conservation District will provide the leadership necessary for the application of land treatment measures.





The Evangeline Parish Police Jury will be responsible for the local share of the cost of installing structural measures, including cost of construction, installation services, land, easements, rights-of-way, and contract administration. A bond issue has already been passed by the local people for the payment of these expenses.

In order that the planned structures be installed in a manner least likely to cause downstream damage to previously installed structures, the schedule below will be followed:

1. Site No. 1 will be completed prior to construction of Site No. 2.
2. Sites 2 and 3 will be completed prior to construction of Site No. 4.
3. Sites 8 and 9 will be completed prior to construction of Site No. 10.
4. Sites 5, 6, 7, 11, 12, 13, 14, 15, and 16 act independently and each may be constructed without regard to the construction schedule of other structures.
5. The channel improvement should be installed only after sufficient floodwater retardation has been accomplished to prevent damage to the channel.

To facilitate completion of the works of improvement, the following schedule will be followed as nearly as possible:

1. First year - contract for construction of Sites 1, 3, 6, 7, 8, 9.
2. Second year - contract for construction of minimum basic facilities and Sites 2, 5, 10, 11.
3. Third year - contract for construction of Sites 4, 12, 13, 14, 15, 16, the channel improvement of Bayou Nezpique, the Floodway, and reconstruction of the disrupted drainage facilities.
4. Fourth year - contract for construction of all remaining channel improvement.
5. Fifth year - complete construction of all structural measures.

Care will be exercised to insure the timely modification or reconstruction of bridges, roads, culverts, etc., in order that they will not be a deterrent to proper functioning of the works of improvement. The police juries



will be responsible for securing all land, easements, and rights-of-way; all road, bridge, utility, and improvement changes; the local share of the installation costs; advertising for bids; and awarding and administering contracts for the construction of all structural measures.

The juries have the power, through the right of eminent domain, to secure needed land, easements, and rights-of-way. The members of the jury have agreed to exercise these rights in the execution of this plan where necessary. Since the members have agreed to use the power of eminent domain, it will not be necessary for all easements to have been obtained prior to beginning any work; however, easements should be obtained on a segment contained in a particular contract prior to the contractor's beginning work on that segment.

Technical assistance will be provided by the Soil Conservation Service to assist in design, preparation of specifications, supervision of construction, preparation of contract payment estimates, final inspection, execution of certificates of completion, and related tasks for the establishment of planned works.

A project agreement will be entered into between the Soil Conservation Service and the Evangeline Parish Police Jury before any contracts are awarded for the installation of works of improvement.

Construction of the planned structural measures will be started as soon as (1) the project is approved; (2) the local people are prepared to discharge their responsibilities; (3) local and Federal funds are available; (4) the necessary land, easements, and rights-of-way have been obtained; and (5) maintenance agreements have been executed.

#### FINANCING PROJECT INSTALLATION

The Federal Government will finance its share of the costs of this project under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress; 68 Stat. 666) as amended. Financial and other assistance to be furnished by the Service in carrying out the project is contingent on the appropriation of funds for this purpose and the fulfillment of prior obligations by the project sponsors.

The Evangeline Parish Police Jury is a legally constituted organization under the laws of the State of Louisiana. It has full authority to incur indebtedness for construction of works of improvement, to levy taxes to repay the indebtedness, and to operate and maintain improvements. Residents have already voted to tax themselves to provide a portion of the cost of project installation. The Louisiana Department of Public Works has agreed to assist in sharing the local cost. This is considered adequate to finance the local share of project installation and to provide funds for operation and maintenance. The sponsors do not intend to utilize the loan facilities of the Farmers Home Administration.





The parish Agricultural Stabilization and Conservation Committee will cooperate with the governing bodies of the soil and water conservation districts in selecting practices and providing financial assistance on those Agricultural Stabilization and Conservation Service practices that will help accomplish the conservation objectives in the shortest possible time.

#### PROVISIONS FOR OPERATION AND MAINTENANCE

Operation and maintenance of all phases of the completed project will be the responsibility of non-Federal groups, agencies, and individuals. Individual landowners and operators will have the responsibility of maintaining land treatment measures. The soil and water conservation district will assume the responsibility of providing technical assistance to landowners in their area of the watershed for the installation and maintenance of needed land treatment measures. Technical assistance necessary to advise and counsel on operation and maintenance will be provided by the Soil Conservation Service, the U. S. Forest Service, and Louisiana Forestry Commission. The objectives will be to maintain adequate drains, vegetative cover, or other conservation practices on the land so that full benefits from the project can be realized.

Operation and maintenance of all phases of the completed structural measures will be the responsibility of the police juries. These duties will be incorporated in their regular parish operation plan. The estimated annual maintenance cost of works of improvement to be installed is \$42,696. Funds are presently available for this work. This operation and maintenance program will consist primarily of, though it will not be limited to, mowing the embankments and levees to eliminate undesirable growth; inspection and repair of fences and gates to protect the works of improvement from damage by overgrazing; inspection of the emergency spillways and embankments to insure a protective cover of vegetation and to determine any excessive rilling that may occur; the inspection of the principal spillways to remove any accumulations of debris, repair, and repaint any portions which may be damaged or may show need for paint; inspection of channels to determine the need for removal of accumulation of silt bars and debris collections or other maintenance of improperly functioning channels; the inspection and repair of the minimum basic facilities as found necessary.

The Evangeline Parish Police Jury will also assume the responsibility of releasing irrigation water as the need arises downstream. The removal of debris from this outlet will be incorporated in the jury's regular operation plan.

The annual operation and maintenance of the minimum basic facilities includes replacement cost over the 100-year evaluation period for the facilities included. This annual cost also includes custodial, policing, sanitation, and safety measures necessary for the continuing enjoyment of the facility by the public.





Chicot State Park is located in Evangeline Parish and has given the police jury needed information as to operating procedures, maintenance needs, and replacement requirements for recreation facilities.

Provisions will be made for representatives of the Soil Conservation Service, the Department of Public Works, the Evangeline and Allen Parish Police Juries, and the Grand Coteau Ridge Soil and Water Conservation District to have free access to all portions of works of improvement at any reasonable time for the purpose of inspection, repair, and maintenance. Representatives of the groups will make a joint maintenance inspection of all works of improvement at least annually. Items of inspection will include, but will not be limited to, condition of vegetative cover, need for removal of sediment and debris accumulations from channels, care of irrigation water facilities, brush control, and condition of minimum basic facilities.

A record of all maintenance inspections and the work to be done will be maintained by the Evangeline Parish Police Jury. This record will be available to other parties or agencies cooperating in the project. The sponsoring local organizations fully understand their obligations for maintenance and will execute a specific maintenance agreement with the Soil Conservation Service prior to the execution of the project agreement for the installation of works of improvement.



**TABLE 1 - ESTIMATED PROJECT INSTALLATION COST**  
**Upper Bayou Nezpique Watershed, Louisiana**

	:	:	:	Estimated Cost (Dollars) <sup>1/</sup>		
	:	:	:	Public Law:	Other	:
Installation Cost Item	:Unit:	Number:	566 Funds	:	Funds	: Total
<b>LAND TREATMENT</b>						
Soil Conservation Service						
Conservation Treatment						
Cropland	Acre	39,930	-	1,313,019		1,313,019
Grassland	Acre	13,210	-	454,944		454,944
Technical Assistance		-	137,834	97,175		235,009
Subtotal - SCS			137,834	1,865,138		2,002,972
Forest Service						
Forest Land	Acre	10,000	-	101,000		101,000
Cooperative Forest Fire Control	Acre	125,000	10,000	10,000		20,000
Technical Assistance		-	18,500	12,500 <sup>2/</sup>		31,000
Subtotal - FS			28,500	123,500		152,000
<b>TOTAL LAND TREATMENT</b>			166,334	1,988,638		2,154,972
<b>STRUCTURAL MEASURES</b>						
Soil Conservation Service						
Construction						
Floodwater Retarding Structure	Each	14	2,019,270	-		2,019,270
Multiple-Purpose Structure	Each	2	529,529	249,051		778,580
Stream Channel Improvement	Mile	61	361,767	50,976		412,743
Channel Reconstruction for Disrupted Facilities	Mile	1.25	7,472	7,472		14,944
Floodway	Mile	0.4	21,716	-		21,716
Minimum Basic Facilities	Group	1	133,760	133,760		267,520
Subtotal - Construction			3,073,514	441,259		3,514,773
Installation Services						
Engineering Services			884,807	46,613		931,420
Other			293,443	-		293,443
Subtotal - Installation Services			1,178,250	46,613		1,224,863
Other Costs						
Land, Easements, and Rights-of-Way						
Value of Land			23,400	514,280		537,680
Legal Fees			-	53,858		53,858
Modification of Facilities			3,750	922,211		925,961
Contract Administration			-	31,100		31,100
Subtotal - Other Costs			27,150	1,521,449		1,548,599
<b>TOTAL STRUCTURAL MEASURES</b>			4,278,914	2,009,321		6,288,235
<b>TOTAL PROJECT</b>			4,445,248	3,997,959		8,443,207

<sup>1/</sup> Price Base: 1965.

<sup>2/</sup> To be provided by Louisiana Forestry Commission.

January 1966



TABLE 1A - STATUS OF WATERSHED WORKS OF IMPROVEMENT

Upper Bayou Nezpique Watershed, Louisiana

Measure	: Unit	: Applied To Date	: Total Cost (Dollars) <sup>1/</sup>
<u>LAND TREATMENT</u>			
Conservation Cropping System	Acre	24,950	43,300
Crop Residue Use	Acre	3,725	16,539
Cover and Green Manure Crops	Acre	60	2,091
Pasture and Hayland Renovation	Acre	3,089	138,261
Pasture Proper Use	Acre	2,107	1,817
Rotation Grazing	Acre	1,789	1,649
Land Smoothing	Acre	14,772	147,387
Contour Farming	Acre	1,230	2,460
Irrigation Water Management	Acre	5,345	21,380
Woodland Proper Grazing	Acre	5,000	10,000
Tree Planting	Acre	2,800	37,800
Woodland Direct Seeding	Acre	3,345	17,383
Total			440,067
<u>STRUCTURAL MEASURES</u>			
Irrigation Systems	Number	13	26,000
Irrigation Canals	Foot	2,640	792
Terraces	Foot	1,200	432
Drainage Mains or Laterals	Foot	418,890	125,667
Drainage Field Ditches	Foot	837,780	50,267
Structures for Water Control	Number	120	12,000
Total			655,225
<u>GRAND TOTAL</u>			1,095,292

<sup>1/</sup> Price Base: 1964.

January 1966









TABLE 2A - COST ALLOCATION AND COST-SHARING SUMMARY

Upper Bayou Nezpique Watershed, Louisiana

(Dollars)  $\frac{1}{1}$ 

Item	Purpose					Total
	:Agri. Water Management:					
	Flood	Increased				
	Prevention	Recreation	Efficiency	Irrigation		
<u>COST ALLOCATION</u>						
<u>Single Purpose</u>						
Floodwater Retarding Structures						
Sites 1, 2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	3,771,919	-	-	-		3,771,919
Floodway	31,236	-	-	-		31,236
Disrupted Facilities	-	-	20,464	-		20,464
Minimum Basic Facilities	-	366,646	-	-		366,646
<u>Multiple Purpose</u>						
Site 3	93,140	299,266	-	-		392,406
Site 5	374,602	-	-	561,901		936,503
Stream Channel Improvement	579,098	-	189,963	-		769,061
TOTAL	4,849,995	665,912	210,427	561,901		6,288,235
<u>COST SHARING</u>						
Public Law 566	3,549,573	360,570	99,187	269,584		4,278,914
Other	1,300,422	305,342	111,240	292,317		2,009,321
TOTAL	4,849,995	665,912	210,427	561,901		6,288,235

 $\frac{1}{1}$  Price Base: 1965

January 1966



TABLE 2B - BASIC RECREATIONAL FACILITIES

Upper Bayou Nezpique Watershed, Louisiana  
Site 3

Item : Number:	Description	: Quantity	: Unit	: Unit Cost	: Estimated Cost
(Dollars)					
1.	ROADS				
	Access, sand-clay-gravel	2.5	Mile	14,950	37,375
	Asphalt surface treatment 2-lane	0.9	Mile	23,436	21,096
	Asphalt surface treatment 1-lane	1.6	Mile	12,815	20,504
2.	PARKING AREA				
	Auto only, asphalt	255	Each	51	13,005
	Auto and trailer, asphalt	25	Each	85	2,125
3.	BOAT LAUNCHING RAMP	650	C.Y.	30	19,500
4.	BOAT DOCK	350	Lin.Ft.	35	12,250
	Boat dock (picnic area)	400	Lin.Ft.	20	8,000
5.	CAMPING AREA				
	1 Table			250	
	1 Fireplace			60	
	1 Garbage mount			50	
	1 Parking barrier			25	
		25	Each	385	9,625
6.	PICNIC AREA				
	2 Tables			500	
	1 Fireplace			60	
	1 Garbage mount			50	
	2 Parking barriers			50	
		25	Each	660	16,500
7.	COMFORT STATIONS				
	Pit type toilet	3	Each	750	2,250
	Flush type toilet w/showers	2	Each	11,500	23,000
	Shelter	1	Each	3,000	3,000
8.	FENCE	5,000	Lin.Ft.	0.55	2,750
9.	CATTLE GUARD	2	Each	500	1,000
10.	SIGNS				
	Orientation	6	Each	100	600
	Direction	12	Each	25	300
	Information	6	Each	150	900
	Main entrance	1	Each	250	250
11.	BEACH				
	Life guard stand	1	Each	150	150
	Sand - 18" deep	9,350	C.Y.	2	18,700
	Retaining wall (Reinforced 8"x5'x800' Concrete)	100	C.Y.	65	6,500
	Depth markers	7	Each	60	420
12.	WATER SUPPLY FACILITIES				
	Well and pump	1	Each	4,500	4,500
	2" Pipe	1.4	Mile	13,200	18,480
	Water taps	14	Each	30	420
	Subtotal				243,200
	10 Percent Contingency				24,320
	TOTAL				267,520





TABLE 3 - STRUCTURE DATA  
FLOODWATER RETARDING STRUCTURES AND WATER SUPPLY RESERVOIRS  
Upper Bayou Nezpique Watershed, Louisiana

Item	Unit	STRUCTURE NUMBER																Total
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Drainage Area (Uncontrolled)	Sq. Mi.	7.30	12.55	7.45	8.67	15.03	6.96	2.78	13.02	6.41	15.61	3.28	4.77	8.02	12.75	10.14	12.28	147.02
Storage Capacity																		
Sediment	Ac. Ft.	39	241	143	83	577	341	118	139	222	216	152	130	111	156	81	118	2,867
Floodwater	Ac. Ft.	2,841	4,818	2,902	3,376	4,810	2,707	1,083	4,859	2,494	4,912	1,278	1,855	3,121	4,896	3,948	4,847	54,747
Recreation	Ac. Ft.	-	-	1,415	-	-	-	-	-	-	-	-	-	-	-	-	-	1,415
Irrigation	Ac. Ft.	-	-	-	8,057	-	-	-	-	-	-	-	-	-	-	-	-	8,057
Total	Ac. Ft.	2,880	5,059	4,460	3,459	13,444	3,048	1,201	4,998	2,716	5,128	1,430	1,985	3,232	5,052	4,029	4,965	67,086
Between High and Low Stages	Ac. Ft.	1,440	2,650	1,431	1,748	2,405	1,476	583	2,221	1,452	2,547	695	1,045	1,650	2,604	2,028	2,476	28,451
Surface Area																		
Sediment Pool	Acres	-	-	60	-	185	68	20	-	-	-	30	-	-	-	-	-	363
Floodwater Pool	Acres	604	1,092	896	752	1,468	518	235	828	514	1,133	257	398	597	854	624	734	11,504
Recreation Pool	Acres	-	-	432	-	-	-	-	-	-	-	-	-	-	-	-	-	432
Irrigation Pool	Acres	-	-	-	-	1,051	-	-	-	-	-	-	-	-	-	-	-	1,051
Volume of Fill	Cu. Yd.	123,920	105,350	63,390	58,000	234,510	135,620	45,890	86,590	88,990	75,790	45,290	76,740	48,860	95,410	121,450	139,100	1,544,900
Elevation Top of Dam (Settle)	Ft. MSL	123.7	105.5	101.5	89.4	102.4	105.5	95.3	108.2	97.0	82.1	85.2	80.1	89.6	90.6	90.0	86.9	-
Maximum Height of Dam	Ft.	25	23	22	20	34	-	20	28	25	21	19	16	24	24	27	28	-
Emergency Spillway																		
Crest Elevation	Ft. MSL	120.4	102.3	98.5	85.9	99.4	100.9	92.1	105.6	93.7	77.9	81.7	76.0	86.2	87.5	86.3	83.5	-
Bottom Width	Ft.	200	200	100	150	200	100	75	2,000	100	400	50	80	200	400	100	300	-
Type		2/	2/	4	2/	4	4	4	2/	2/	4	4	4	2/	2/	4	2/	-
Percent Chance of Use	Percent	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	-
Average Curve No. - Condition II																		-
Emergency Spillway Hydrograph																		-
Storm Rainfall (6-hr)	In.	7.90	7.90	7.90	7.90	7.90	7.90	7.90	10.75	7.90	7.90	7.90	7.90	7.90	7.90	7.90	7.90	-
Storm Runoff	In.	5.01	5.01	4.95	5.01	4.74	4.95	4.95	7.39	5.01	4.72	5.01	5.01	4.95	4.84	5.00	4.87	-
Velocity of Flow (Vc) 1/	Ft./Sec.	3.45	4.00	-	5.30	-	-	-	-	3.90	-	4.10	4.00	-	-	4.45	-	-
Discharge Rate 1/	CFS	259	402	-	697	-	-	-	-	189	-	108	163	-	-	272	-	-
Maximum Water Surface Elevation 1/	Ft. MSL	120.9	102.7	-	86.0	-	-	-	-	94.2	-	82.2	76.6	-	-	86.7	-	-
Freeboard Hydrograph																		-
Storm Rainfall (6-hr)	In.	15.60	15.60	15.60	15.60	15.60	15.60	15.60	23.10	15.60	15.60	15.60	15.60	15.60	15.60	15.60	15.60	-
Storm Runoff	In.	12.35	12.35	12.21	12.35	11.78	12.21	12.21	19.11	12.35	11.75	12.36	12.36	12.21	11.99	12.34	12.03	-
Velocity of Flow (Vc) 1/	Ft./Sec.	5.85	7.75	7.20	8.40	7.30	7.65	6.60	6.60	7.95	9.35	8.15	8.70	7.70	5.90	8.60	6.55	-
Discharge Rate 1/	CFS	1,241	2,888	1,160	2,767	2,400	1,410	670	17,600	1,528	10,230	842	1,641	2,850	2,550	1,976	2,600	-
Maximum Water Surface Elevation 1/	Ft. MSL	123.7	105.5	101.2	89.4	101.9	104.3	94.6	108.2	97.0	82.1	85.2	80.1	89.6	90.1	90.0	86.4	-
Principal Spillway																		-
Capacity - Low Stage	CFS	49	134	50	243	101	47	19	88	43	236	22	32	54	86	68	83	-
Capacity - High Stage	CFS	132	384	175	722	583	132	76	656	124	1,411	88	99	164	240	190	194	-
Capacity Equivalents																		-
Sediment Volume	In.	0.10	0.36	0.36	0.18	0.72	0.92	0.80	0.20	0.65	0.26	0.87	0.51	0.26	0.23	0.15	0.18	-
Detention Volume	In.	7.30	7.20	7.30	7.30	6.00	7.30	7.30	7.00	7.30	5.90	7.30	7.30	7.30	7.20	7.30	7.40	-
Recreation Volume	In.	-	-	3.56	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Irrigation Volume	In.	-	-	-	-	10.05	-	-	-	-	-	-	-	-	-	-	-	-
Spillway Storage	In.	7.05	6.14	6.87	6.45	5.18	4.77	4.78	3.59	5.74	7.10	6.65	7.10	5.29	4.57	5.41	4.15	-
Class of Structure		A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	-

1/ Maximum during passage of hydrograph.

2/ Vegetated.



TABLE 3A - STRUCTURE DATA  
Floodway Development

Upper Bayou Nezpique Watershed, Louisiana

Floodway (number)	Length (feet)	Design Capacity (c.f.s.)	Bottom Width (feet)	Design Depth: of Flow (feet)	Earth Fill (cu. yds.)
1	2,200	2,250	500	2.7	33,147

Jaunuary 1966









TABLE 4 - ANNUAL COSTS

Upper Bayou Nezpique, Watershed, Louisiana

(Dollars)

Evaluation Unit	: Amortized	: Operation	:
	: Installation	: & Maintenance	:
	: Cost <u>1/</u>	: Cost <u>2/</u>	: Total Cost
Floodwater Retarding Structures, Floodway, Multiple-Purpose Structures, Diversion, Channel Improvement, and Minimum Basic Facilities	206,002	42,696 <u>3/</u>	248,698
TOTAL	206,002	42,696	248,698

1/ Price Base: 1965 amortized for 100 years @ 3-1/8 percent.2/ Long-term prices as projected by ARS, September 1957.3/ Includes \$7,922 for replacement cost.

January 1966



TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

Upper Bayou Nezpique Watershed, Louisiana

(Dollars) 1/

Item	:Estimated Average Annual Damage:			Damage
	: Without	:	With	: Reduction
	: Project	:	Project	: Benefits
<u>FLOODWATER</u>				
Crop and Pasture	170,084		68,116	101,968
Other Agricultural	10,530		3,199	7,331
Non-Agricultural	840		428	412
Road and Bridge	11,169		5,190	5,979
Subtotal	192,623		76,933	115,690
<u>SEDIMENT</u>				
Reservoir	383		307	76
Subtotal	383		307	76
TOTAL	193,006		77,240	115,766 <u>2/</u>

1/ Price Base: Long-term prices as projected by ARS September 1957.2/ Includes \$3,011 damage reduction due to land treatment measures.

January 1966



TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Upper Bayou Nezpieque Watershed, Louisiana

(Dollars)  $\frac{1}{/}$ 

Evaluation Unit	Damage Reduction $\frac{2}{/}$	Intensive Land Use	Efficiency Increased	Irrigation: Redevelopment	Recreation: Secondary	Total	Average Annual Cost $\frac{4}{/}$	Benefit-Cost Ratio
			Agricultural Water Management $\frac{3}{/}$					
Floodwater Retarding Structures, Floodway, Multiple-Purpose Structures, Diversion, Channel Improvement, and Minimum Basic Facilities	112,755	39,765	11,426	34,886	17,430	53,250	48,618	318,130 248,698 1.3:1
TOTAL	112,755	39,765	11,426	34,886	17,430	53,250	48,618	318,130 248,698 1.3:1

 $\frac{1}{/}$  Price Base: Long-term prices as projected by ARS, September 1957. $\frac{2}{/}$  From Table 5. An additional \$3,011 of benefits are due to land treatment measures. $\frac{3}{/}$  Includes \$36,905 from reduced production cost and \$6,669 from increased prices received as a result of improved quality. $\frac{4}{/}$  From Table 4.

January 1966





## INVESTIGATIONS AND ANALYSES

### Cover Conditions and Land Use

The soil cover determinations were made from existing work unit records, soil surveys, and field inspections. Additional information to verify soil cover conditions was obtained from detailed studies made for determination of sediment rates to structures.

The land use on the area was determined from existing work unit records, from sediment source studies, and from systematic field surveys.

### Land Use and Treatment Needs

Records of accomplishments, tabulations of conservation needs inventories, field surveys, and information from the work unit of the Soil Conservation Service, other agricultural offices, and forestry officials, were used to determine the probable land uses and treatment to be expected under going programs. The measures considered needed contribute to flood reduction and soil stabilization. The land treatment measures planned are limited by the expected participation and the length of the installation period. Although benefits would result from application of these land treatment measures, it was apparent that structural measures would be needed to attain the degree of watershed protection and flood damage reduction desired.

### Structural Measures

Structural Measures which would be feasible to install were determined. The following studies were made to determine the most feasible plan for flood prevention, agricultural water management, and recreation.

1. A watershed base map was prepared using U. S. Geological Survey quadrangle sheets, showing the watershed boundary, possible individual sites, drainage areas, systems of roads, railroads, channels, and other pertinent information. A stereoscopic study of consecutive 4-inch photographs and the base map was used to locate all possible floodwater retarding structure sites. This study also helped determine the approximate limits and area of the floodplain and points where valley cross sections should be taken for flood routing purposes. This information was retained on the watershed base map for later reference and for use in field surveys. Surveys of the valley cross sections at the designated places permitted the hydrologist to determine stage-area inundated relationships for various flood flows.



2. A field examination was made of all floodwater detention sites previously located stereoscopically. Those sites which were obviously inadequate were dropped from further consideration. A system of floodwater retarding structures was selected from the remaining sites for further consideration and detailed survey. Plans of a floodwater retarding structure, typical of those planned for the watershed, are illustrated by figures 2, 3, and 4.

3. Damages resulting from floodwater and benefits to be derived from adequate agricultural water management were determined from damage and production schedules and surveys of the floodplain area. Reduction of these damages and realization of these benefits by the installation of these structural measures were estimated on the basis of reduction in peak discharge, reduction of area-depth of inundation as determined by flood routings and estimates of reduced production cost, and increased net returns without project and with proposed works of improvement installed. Several alternate systems of structural measures were evaluated, and a system was selected to meet project objectives at least cost.

4. The combined project for watershed protection, flood prevention, agricultural water management, and recreation was evaluated. Studies were made and data developed to show the total cost of each type of measure and the portion of the cost to be borne by the participants. A summation of the total costs for all planned measures is shown in table 1. A second cost table was developed to show the annual installation cost, annual maintenance cost, and total annual cost of the structural measures (table 4).

5. The local sponsors requested that additional water be stored in one site for recreation and that minimum basic facilities for a recreational area be installed as part of the work plan. They also requested that additional water be stored in one site for irrigation water. Site 3 was selected for the recreational site and Site 5 was selected for the irrigation storage site. Flood storage as necessary will be included in each of these two multiple-purpose sites.

#### Engineering Investigations

1. Detailed topographic maps with 4-foot contour intervals and a scale of 1 inch to 660 feet or 1 inch to 1,320 feet were developed from surveys made in the pool areas of 12 of the 16 sites. Horizontal and vertical control points were surveyed in the field according to prescribed methods. With field survey data, aerial photography, and stereoscopic coverage, topographic maps were developed on the four remaining sites, using the Kelsh Plotter. The contour interval on these topographic maps was 5 feet, and the scale used was 1 inch to 660 feet. The centerline profile of each site was surveyed and the stage-storage relationship computed.

2. On the basis of the stage-storage relationship, the elevations required to provide needed storage volume were determined. Additional





storage was provided in Site No. 3 for recreation, and in Site No. 5 for irrigation water storage. At the elevations of the emergency spillways the design storm storage is satisfied. The emergency spillways were proportioned to carry the peak outflows from the design storm at safe velocities, and to carry the freeboard storm without overtopping the dams.

3. Channel capacities below all structure sites were determined. All were found adequate to carry release rates up to a 5-year frequency from the sites. With due regard for the wishes of the local sponsoring organizations, approximately 91 miles of channels were surveyed to determine need for improvement. Cross sections of the channels were taken at approximately 1,000-foot intervals. The drainage areas were obtained from aerial photographs and field reconnaissance. Design of the channels was based on drainage curves, coastal area cultivated ( $Q = 45M^{5/6}$ ) for the flatlands, and minimum hill ( $Q = 80M^{0.753}$ ) for the hilly land. The runoff for urban areas was determined by increasing the runoff from the ( $Q = 45M^{5/6}$ ) curve by 25 percent. Investigation showed 61 miles of channels need improvement. Of this total, 44 miles will require enlargement and 17 miles will require clearing and shaping.

4. The limits of the flood pools and the sediment pools of all sites were drawn, using the previously prepared topographic maps as a base. Data tables were developed for each structure showing the drainage area, the storage in acre-feet, inches of runoff from the drainage area, the release rates of principal spillways, the acres inundated by the sediment and detention pools, the volume of fill in the dams, the estimated cost of the structures, and other pertinent data (tables 2 and 3).

5. Land ownership maps were prepared showing the proposed channel locations by using the watershed base map. Data tables were developed for each channel showing the drainage area, drainage curves used for design, required capacity, design capacity, velocity of water flow, and other pertinent information (table 3B).

6. The floodwater detention capacity required for Site No. 8 is that needed to detain temporarily the runoff from a 50-year frequency storm. The detention capacity of the remaining 15 sites is that needed to detain temporarily the runoff from a 25-year frequency storm. Sites 3 and 5 have additional storage for recreation and irrigation respectively. These two sites should have slope protection due to the large amounts of open water facing the dams and the easily erodable borrow materials to be used in construction. A suitable soil to be used as soil cement aggregate was not found in the watershed area. Therefore, sufficient cost was added to allow soil cement aggregate to be hauled in. The average depth of the sediment pools of most of the sites (excluding sites 3, 5, 6, 7, 11) would be less than two feet. Sites 6, 7, and 11 have sediment pools that have greater depth. All sites except Sites 3, 5, 6, 7, and 11 were designed as dry pools. Side slopes, core trench depths, and foundation requirements were supplied for each structure by the geologist.





Determinations were made that two-stage inlets would be used on the principal spillways of each site. The emergency spillways were proportioned by flood routing through the reservoirs. Vegetated earthen spillways were used and were proportioned by flood routing through the reservoirs. Where roads, bridges, pipelines, powerlines, houses, and other high value items were involved or were in danger of inundation by the structures, additional surveys were made as necessary to adequately reflect the cost of removal, modification, or relocation of the facility. The sponsoring local organization was informed of the procedures used in determining the need for removal of these facilities.

7. A vegetated floodway was developed on the East Fork of Bayou Nezpique below Millers Lake. This was done in order to confine the high stage outflows over the emergency spillways of this lake. This floodway will protect highly productive agricultural lands and will confine the floodwaters to the low value woodland adjacent to the higher agricultural lands.

8. An itemized cost estimate was made of each structure. Unit costs were estimated on the basis of costs of similar structures in the area. A 10 percent contingency allowance was added to the estimate of the construction cost of all measures. Cost distribution tables were developed (tables 2 and 2A).

9. Itemized cost estimates were also made for each of the channels, using unit costs of similar construction items in the area.

The estimated cost of operation and maintenance for structural measures was developed. These costs represent the least costly method of accomplishing the project objectives.

#### Hydraulic and Hydrologic Investigations

Four stream runoff gaging stations are located in or near the Bayou Nezpique Watershed. Two of these stations, Bayou Nezpique at Basile and Bayou des Cannes near Eunice, have adequate records for frequency evaluation. The other two gages, East Fork of Bayou Nezpique near Reddell, and Boggy Bayou near Pine Prairie, have only intermittent readings.

A duration analysis of storm runoff was made at the Bayou Nezpique gage near Basile. From this study it was determined that a 36-hour single event storm was the most representative storm for floodwater evaluation. The 36-hour rainfall amounts for various frequencies were extrapolated from U. S. Weather Bureau Technical Paper 40. After the analysis of these storms was nearly complete, Weather Bureau Technical Paper 49 was issued and the frequency of the evaluation storms was adjusted to correspond to this additional information.



The hydrologic soils groups in the watershed are 3 percent Group B, 66 percent Group C, and 31 percent Group D. The present land use is 18.6 percent cultivated, 6.2 percent meadow and pasture, 70.2 percent woodland, and 5.0 percent miscellaneous. The future land use is projected to be 18.9 percent cultivated, 7.6 percent meadow and pasture, 66.5 percent woodland, and 7.0 percent miscellaneous. The weighted curve numbers for present and future, with moisture condition II, were determined using standard procedures.

Valley cross sections were taken at representative locations from the confluence of Bayou Nezpique and the Mermentau River up to the various floodwater retarding structures. Water surface profiles and depth-area inundated relationships were computed using the IBM 650 Computer for present conditions and with project conditions, with and without channel improvement. The runoff-peak discharge relationship was computed with the IBM 7090/7094 Computer for various study conditions.

The frequency method of damage evaluation was used. The output data from the IBM 650 water surface profiles and area inundated computations was used to develop a discharge-versus-elevation and area-inundated-versus-elevation curve for each IBM 7090/7094 routing reach. Damages were summarized for various frequency storms for 0- to 1-foot, 1- to 3-foot, and over 3-foot depths of flooding for present conditions, future conditions with land treatment only, and four alternatives of structural measures.

Sixteen structures and channel improvement were determined to best accomplish the project objectives. The channel improvement design includes agricultural water management requirements and allowances for release flows.

The principal spillway design for the floodwater retarding structures includes two-stage inlets, with a lower stage average release rate of 5 c.s.m. for flood flows from the uncontrolled drainage areas. An additional allowance for base flow of 0.5 c.s.m. was added to the low stage inlets of all sites. The base flow was computed from low-flow records at the Bayou Nezpique gage at Basile. The storage for the lower stage was held to a maximum of one-half the total storage. The detention storage and emergency spillway capacity of each site were designed according to Soil Conservation Service standards.

Two of the floodwater retarding structures are multiple-purpose structures. Site No. 5 includes irrigation water, as well as floodwater detention storage. The dependable yield for the sites was based on the 90 percent chance runoff for the irrigation period at the Basile gage. An irrigation period from April 15 to August 15 was used.

Evaporation losses were computed using annual evaporation maps for Louisiana based on data from the U. S. Weather Bureau Climatological Data. Irrigation demands were based upon the maximum possible acreage of cropland adjacent to Bayou Nezpique, adjusted by the percent of local people that indicated an interest in irrigation water. Base flow in Bayou





Nezpique for the irrigation period was evaluated using the Basile gage and was included in the water budget. The benefits from irrigation were reduced an additional 20 percent to compensate for channel losses.

Site No. 3 includes 3.56 inches of recreational storage. Studies made indicate there is sufficient drainage area to provide adequate yield to insure use of this site as a recreation reservoir.

The channel improvement from the Millers Lake to the watershed outlet is necessary to provide an outlet for agricultural water management. The present system has a bank-full capacity of only 0.13 inches in 24 hours at several locations. This allows out-of-bank flow to occur an average of five times per year. The with project design for channel improvement will provide a 2-year frequency level of flood protection. This level of protection will reduce out-of-bank flow by 87.4 percent.

The combined project of channel improvement and floodwater detention structures provides the maximum floodwater damage reduction within the watershed.

The with project peak below the watershed is only slightly lower than the present conditions peak. However, duration and volume of flood flow is greatly reduced. Therefore, as the flood passes downstream, peaks are reduced to a larger extent.

This volume reduction was flood routed downstream below the watershed to the junction of Bayou Nezpique, Bayou des Cannes, and Plaquemine Brule at the Mermentau River. It was determined that the Bayou Nezpique project offsets the anticipated increase in flood peaks caused by the proposed channel improvement in the Bayou des Cannes Watershed. The conclusion from this flood routing is that the Evangeline Parish watersheds will not cause any increase over present conditions in downstream peaks on the Mermentau River.

#### Sedimentation Investigations

Sedimentation investigations were conducted in accordance with Louisiana Watersheds Memorandums 201 and 202. The following reference material was also used: (1) "A Method for Estimating the Rate of Soil Loss by Sheet Erosion From Individual Fields or Farms Under Various Types of Land Treatment" <sup>1/</sup> and (2) "Factors Influencing Sediment Delivery Ratios in the Blackland Prairie Land Resource Area." <sup>2/</sup> Unit weight of sediment was based on "Rates of Sediment Production in the Western Gulf States." <sup>3/</sup>

Five of the proposed sixteen sites were investigated in detail. Soil loss on these sites was computed using Musgrave's Equation. Land use, gully erosion, channel erosion, sheet erosion, and roadside erosion were checked on all sites. Sheet erosion was the largest cause of sediment in the watershed.

<sup>1/</sup> A paper by L. H. Barnes and S. B. Maner, USDA, SCS, December 1953.

<sup>2</sup> A paper by L. H. Barnes and S. B. Maner, USDA, SCS, August 1962.

<sup>3/</sup> A paper by G. M. Brune, S. B. Maner, G. W. Renfro, and J. A. Ogle, USDA, SCS, March 1965.





Average annual erosion of that section of the watershed above the proposed sites amounts to one ton per acre. Delivery rates of the proposed dam sites amount to approximately 48 percent. In places, upland density of the soils is approximately 95 pounds per cubic foot. Based on similar material, it was estimated that submerged sediment would weigh approximately 50 pounds per cubic foot and aerated sediment would weigh approximately 75 pounds per cubic foot.

Due to the small amount of sediment and to the nature of the floodplain, no sediment or scour damage was assessed on the floodplain.

Four of the sixteen sites were investigated by soils borings. Six of the sites were investigated with a hand auger, and six were visually inspected as to the soils involved.

All sites are located on either Montgomery or Prairie Terrace deposits. These formations normally consist of SM, CL, and CH materials. The valleys are "drowned valleys" and normally have sandy material in the floodplain. The water table is relatively high and may create some foundation investigation on all sites that have not been drilled in detail. Borrow conditions must be investigated on all sites.

#### Economic Investigations

The watershed was divided into three reaches. Reach I is the gently sloping lands of the Pine Prairie area. In this reach there are 617 acres of crop and pasture land that require flood prevention and agricultural water management. Reach II is the flat lands adjoining the main stem bayous and creeks that would be flooded from a storm which would occur once every hundred years. For the purpose of evaluating crop and pasture damage, all of the low-lying wooded areas that flood several times each year were eliminated from consideration of damages. The remaining 30,000 acres of cropland, grassland, woodland, and miscellaneous land require flood prevention and agricultural water management in the forms of increased efficiency and irrigation. Reach III is the flat lands outside of Reach II that would not be flooded from the storm which would occur once every hundred years, except for small localized areas. In this reach there are 23,158 acres that require flood prevention and agricultural water management.

Damages and benefits for the 53,775 acres in the three reaches were evaluated for project justification. Benefits will accrue to additional acreage within the watershed. However, these acreages are in woodland, and information available would not permit the evaluation of benefits.

Local landowners, operators, agricultural processors, and other people in agriculture were contacted to obtain production levels and production costs. Land use was determined from strip maps and schedules, which covered approximately 20 percent of the area.



To determine damage reduction in Reach II, the frequency method of evaluation was used. Information furnished by the hydrologist showed acreages inundated at various depths for seven different size storms. This information also showed the effect of land treatment measures and structural measures on acreage inundated.

Damageable values by individual crops were developed using local information on production, costs, practices, and increased expenditures. These values were applied to a composite acre which had been determined from the strip maps. A damageable value for the composite acre was determined by depth inundated and was used to determine total damage and damage reduction. A probable frequency of flood damage curve was developed for without and with project conditions. The difference in damage was assumed to be the damage reduction due to project installation.

Other agriculture, road and bridge, and non-agricultural damage was determined from schedules representing the key storm and developing a probable frequency of flood damage curve, without and with project. The difference was assumed to be the damage reduction.

Schedules taken within Reach II indicated that landowners and operators would intensify their cropping pattern if their lands were afforded flood protection. Information from the hydrologist showed that 15,400 acres of crop and pasture land in this Reach is flooded from the runoff of a rainfall event which is not expected to occur more often than once in about seven years. With land treatment measures in place, this acreage flooded would be reduced to 14,800. With structural measures in place, this will be further reduced to 7,040. The remaining 7,760 acres will have flood-free protection from this flood event. Intensification will occur in this area.

Sediment damage was evaluated on Millers Lake. The value of one acre-foot of water was determined from present worth of the structure. Sediment rates in acre-feet without and with project installation were furnished by the geologist. The difference between without and with project installation times the value of one acre-foot of water was considered damage reduction. Reaches I and III were evaluated in the same way, but separately. Damages in the form of reduced yields, late plantings, increased weed control, and increased harvesting costs are caused from flooding and drainage problems. These problems are due to inadequate outlets for on-farm drainage systems. Tables were developed for these two reaches showing average production for crops under future conditions, without and with project installation. The difference was assumed to be benefits to the project.

Schedules were taken from 17 landowners and operators along and adjacent to Bayou Nezpique concerning their ability to utilize water for irrigation purposes from the bayou. Budgets developed on the cost of irrigation water for one acre of rice for one growing season, using their present sources of water, averaged an expenditure of \$30.67. Irrigation





expenditures for the same acre using water from Bayou Nezpique averaged \$10.00. The reduced cost of \$20.67 per acre was applied to the 2,174 acres which could be irrigated from the bayou. These reduced production costs were considered irrigation benefits.

Recreation benefits were evaluated on a per-acre surface area use by purpose. Similar facilities on seven lakes in Louisiana were used in projecting use-days per surface acre of water by activity. Population projections to 1980 were used in determining visitors by activity in order to provide proper facilities. A value of \$1.50 per visitor-day was used in determining annual benefits.

In determining redevelopment benefits, employment officers on similar projects were contacted regarding the amount and kind of labor that could be expected to be hired from local labor sources. The information obtained was used as a basis for determining the benefits that would occur from project installation. Operation and maintenance annual costs were also evaluated in determining redevelopment benefits.

Secondary benefits were considered to be 10 percent of all primary benefits and 10 percent of increased production costs and associated costs. Appropriate lags, discounts, participation, and associated costs were applied to the benefits to obtain realistic figures.

The installation cost of structural measures was amortized for 100 years at 3-1/8 percent interest to obtain average annual costs.

Operation and maintenance costs were based on similar projects and were approved by the state conservation engineer.

Land, easements, and rights-of-way costs were based on values assigned by the project sponsors, local real estate agencies, and local bankers. All benefits are in terms of long-term prices as projected by Agricultural Research Service, September 1957.

#### Forestry Investigations

A systematic field survey showed ground cover, forest and hydrologic conditions, and treatment needs. This survey, supporting data, and information from other agencies and forestry officials determined the amount of remedial measures. The measures recommended contribute to flood reduction and soil stabilization. The forest land treatment measures planned on private land are limited by the expected participation and the length of the installation period.

#### Fish and Wildlife Investigations

The Soil Conservation Service biologist made a visual reconnaissance of the vegetation (wildlife habitat) and wildlife populations in the watershed





area. Land species, vegetative patterns, and land use practices were studied as they pertain to wildlife habitat. Reservoir sites were observed and evaluated as wildlife habitat, both for fishing and providing food and cover for terrestrial species. Local residents and sportsmen were questioned concerning wildlife populations and hunting and fishing activity.



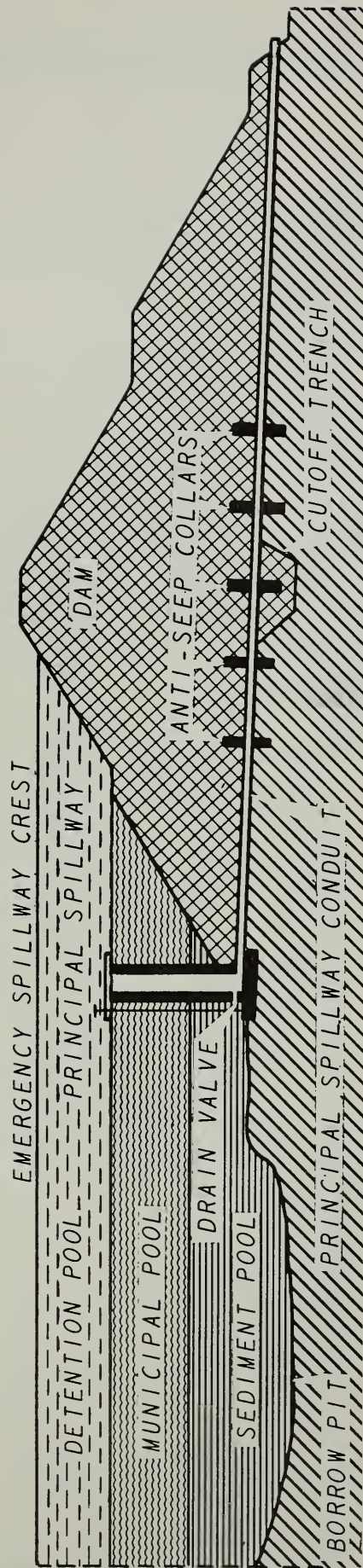


Figure 1  
SECTION OF A TYPICAL MULTIPLE PURPOSE STRUCTURE



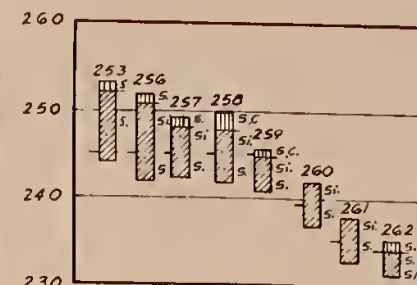


A minimum of 6" of topsoil to be placed in spillway and on all embankment, dike, spillway slopes and waste areas except where rock is encountered or rock rip rap is placed. See the specification.

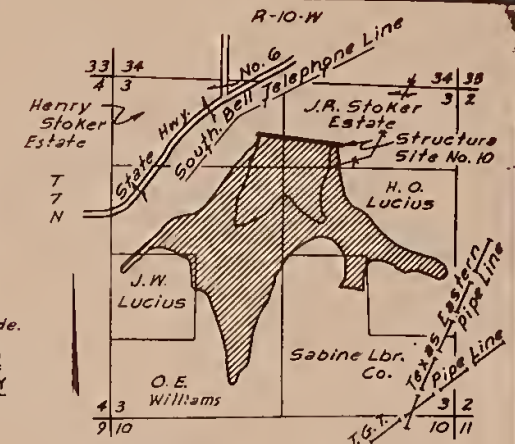
Gravel	C. Clay Clayey
Clay	S. Sand Sandy
Sand	Sh. Shale Shaly
Silt	Si. Silt Silty
Siltstone	O.M. Organic Matter
	So. Soft

### LEGEND OF BORINGS

ELEVATION	SURFACE ACRES	STORAGE ACRE FT.	INCHES
236.9	35	110	0.80
237.5	41	137	1.00
240.0	62	264	1.93
244.0	99	586	4.28
247.4	129	973	7.10
248.0	135	1054	7.69
248.4	137	1097	8.00
252.0	163	1660	12.11
256.0	205	2406	17.33
Top of Dam (Effective) Elev.			252.4
Spillway Crest Elev.			247.4
Top of Riser Elev.			243.9
Sediment Pool Elev.			236.9
Drainage Area, Acres			1645
Sediment Storage, Ac. Ft.			137
Floodwater Storage, Ac. Ft.			836
Max. Spillway Capacity, c.f.s.			4125

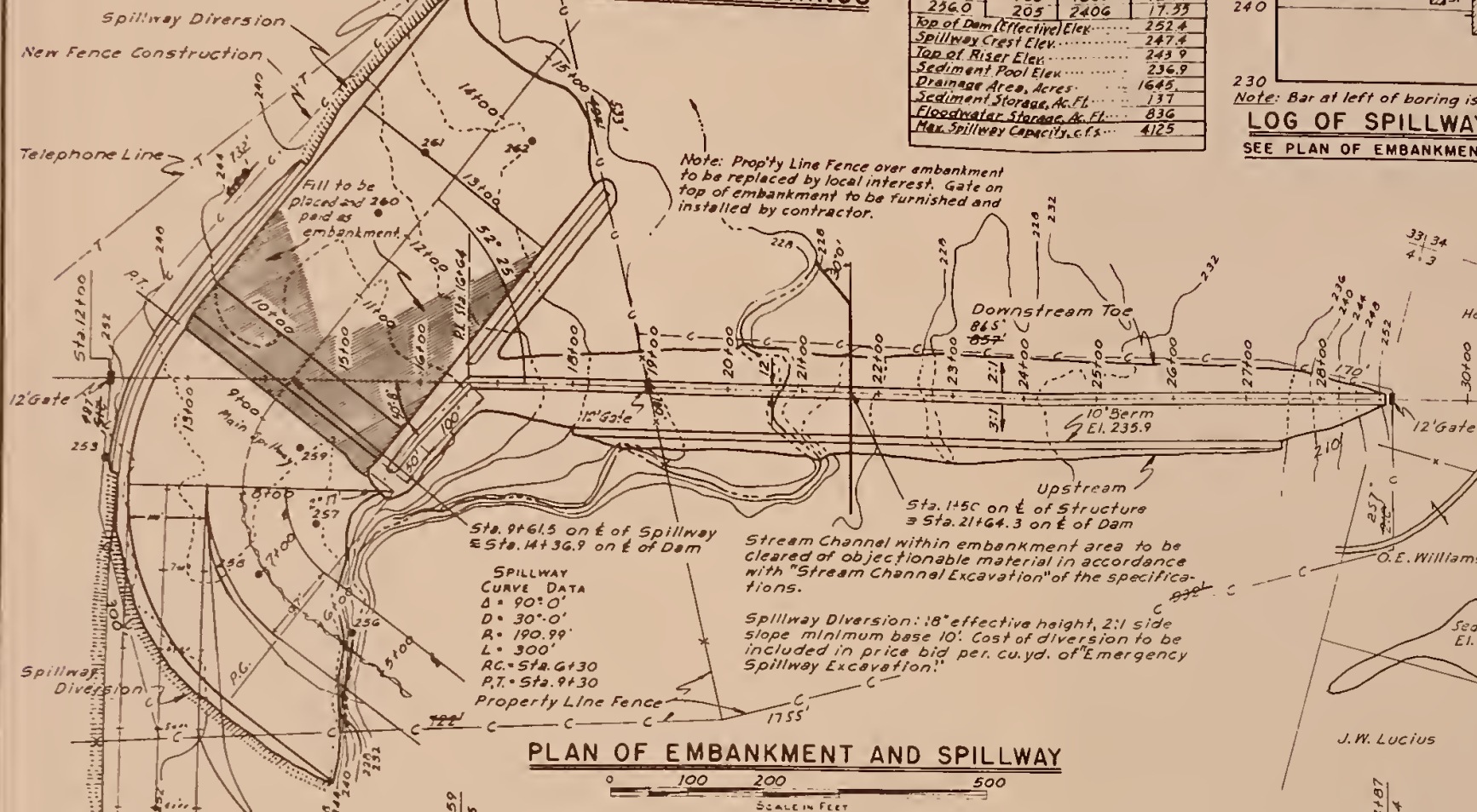


Note: Bar at left of boring is at spillway grade.  
**LOG OF SPILLWAY BORINGS**  
 SEE PLAN OF EMBANKMENT AND SPILLWAY

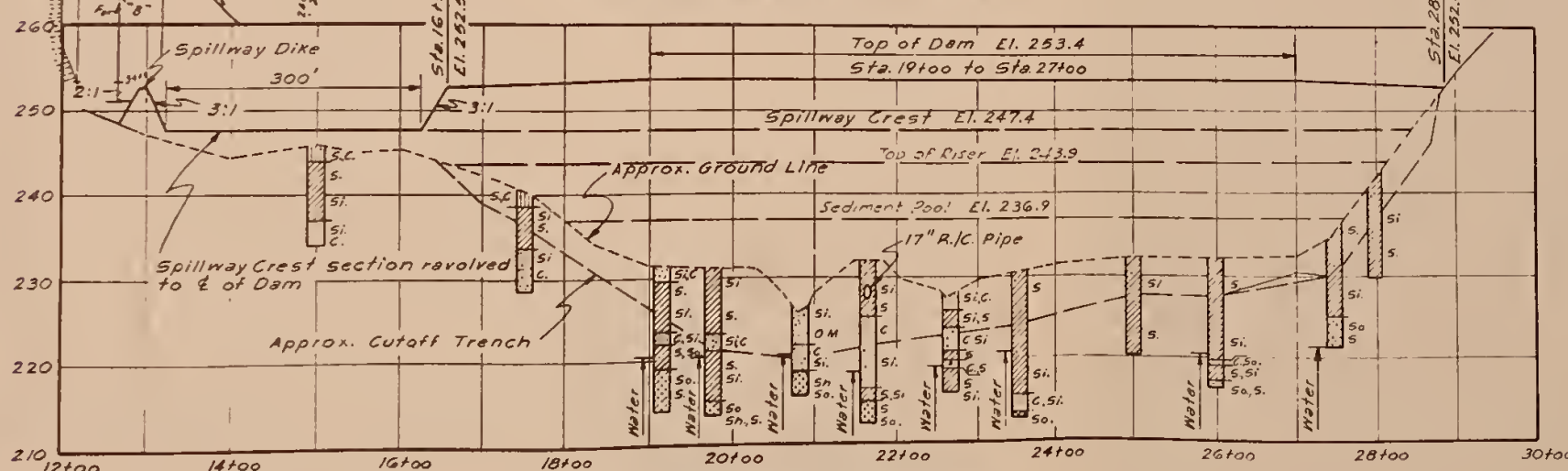
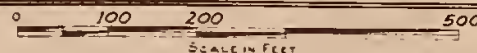


Located 1 mi. North and 1 mi. East from Ft. Jesup, in Sabine Parish, Louisiana.

### VICINITY MAP



### PLAN OF EMBANKMENT AND SPILLWAY



### PROFILE ON C OF DAM

### GENERAL PLAN OF RESERVOIR

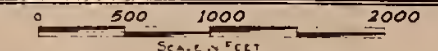


Figure 2

TYPICAL  
 FLOODWATER RETARDING STRUCTURE  
 GENERAL PLAN AND PROFILE  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed	H.H.L.	1-57	Approved by	2-57
Drawn	H.H.L. & G.R.	2-57	Checked	2-57
Traced	G.R.	2-57	Sheet	no 2 of 7
Checked	H.H.L.	2-57	Date	4-E-11, 194





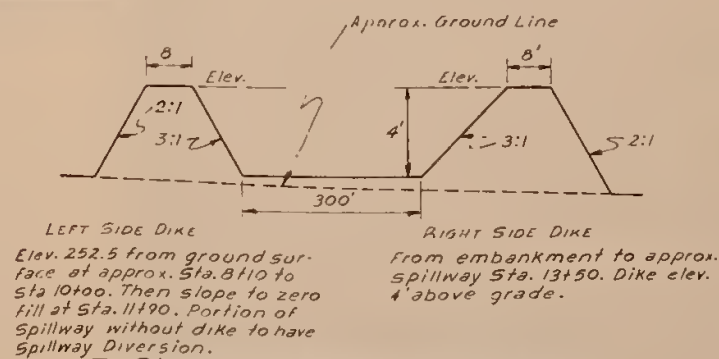
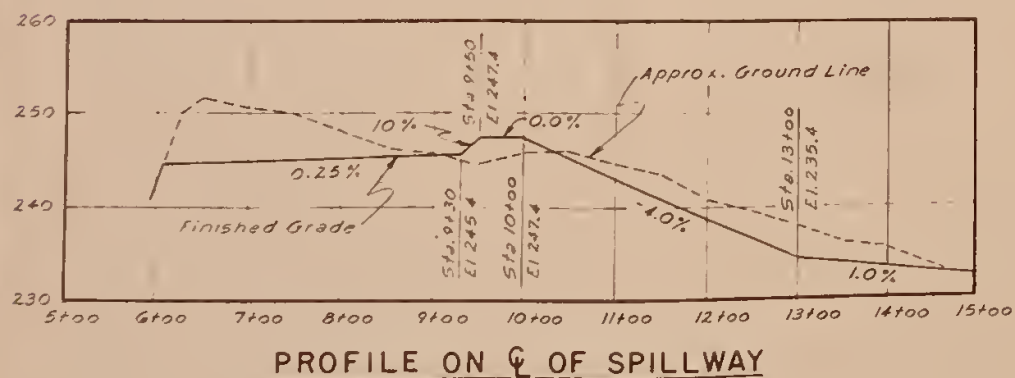
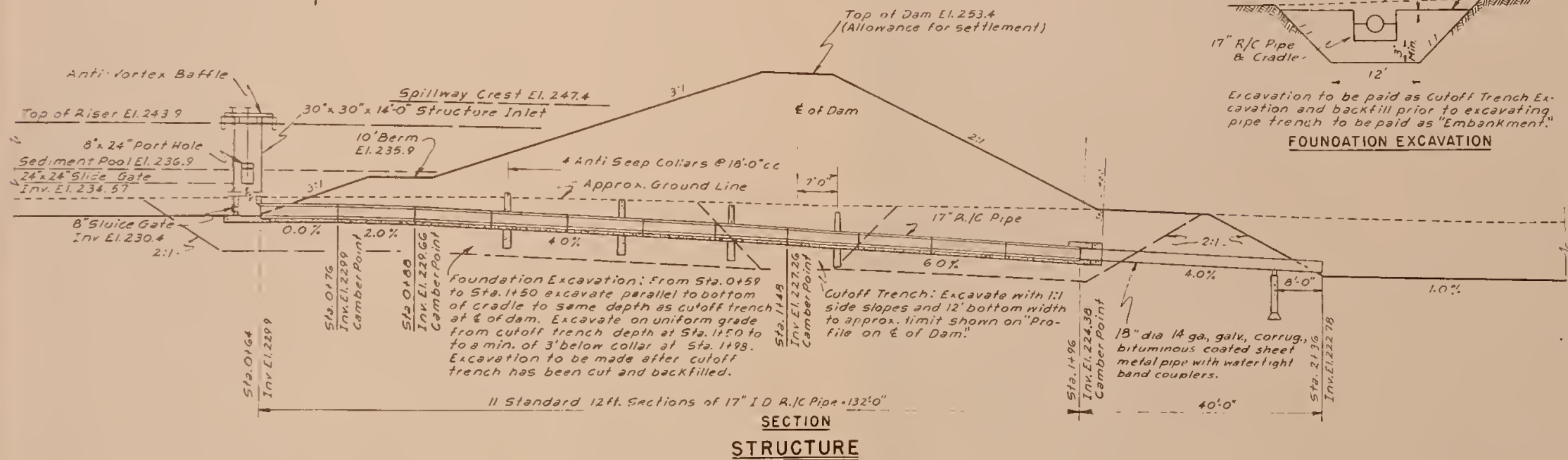
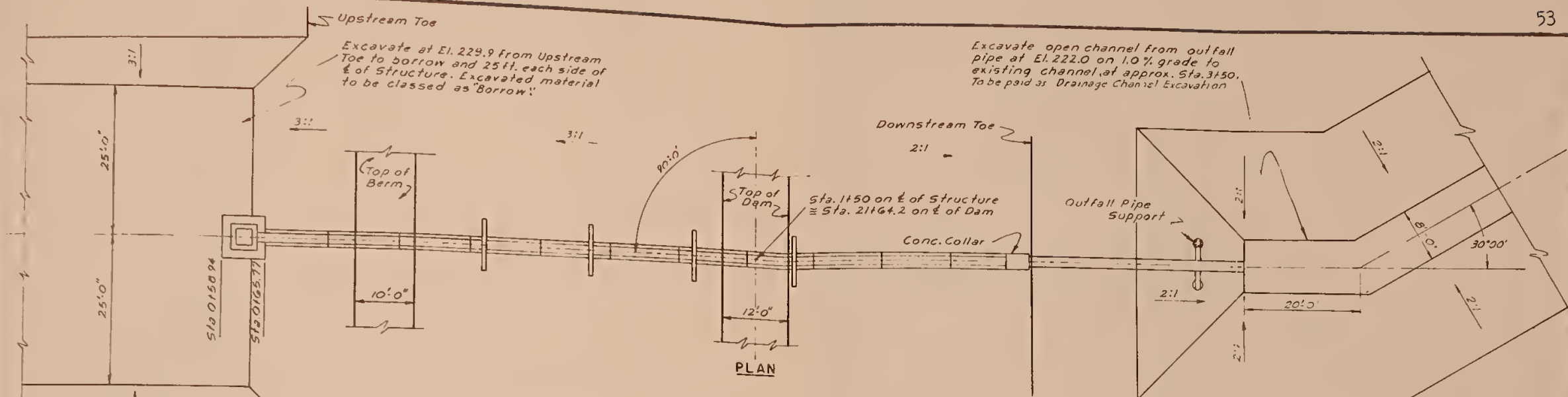


Figure 3

**TYPICAL  
FLOODWATER RETARDING STRUCTURE  
STRUCTURE PLAN AND SECTION**

**U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE**

Designed	H.H.L.	1-57	Approved	H.H.L.	2-57
Drawn	H.H.L. & G.R.	2-57	Checked	H.H.L.	2-57
Traced	G.R.	2-57	Reviewed	H.H.L.	2-57
Created	H.H.L.	2-57	Scale	1" = 10'	
			Sheet	3	
			Fig.	2	
			Project	4-E-11,194	



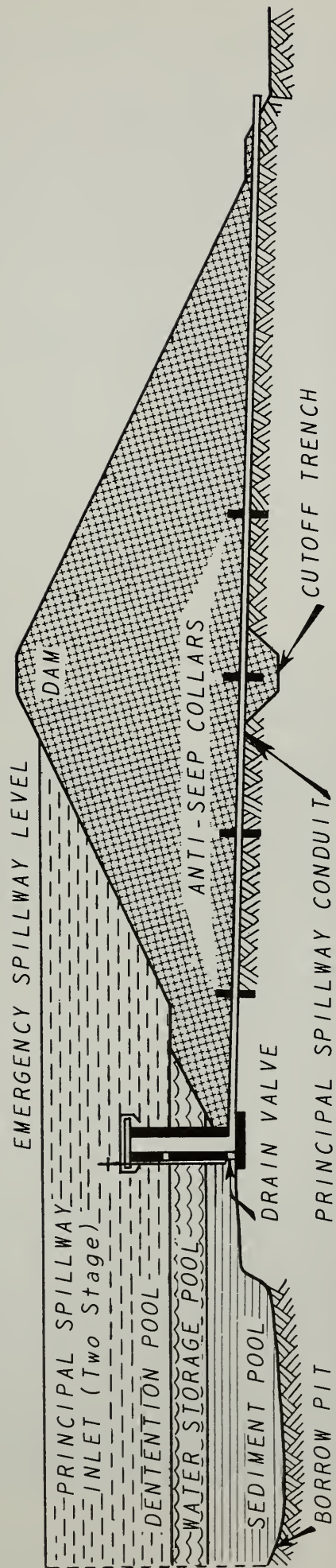
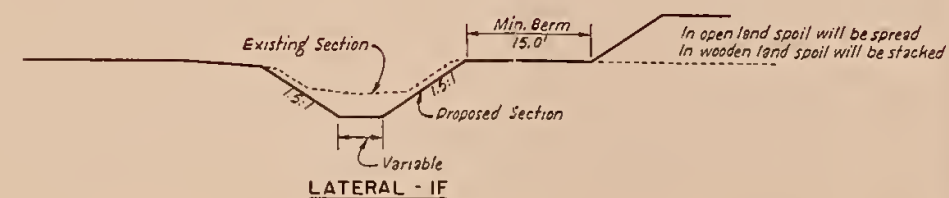
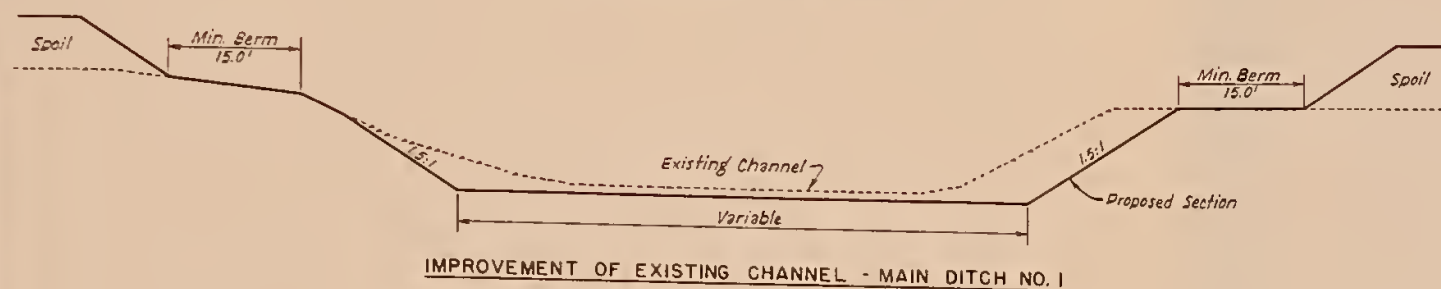
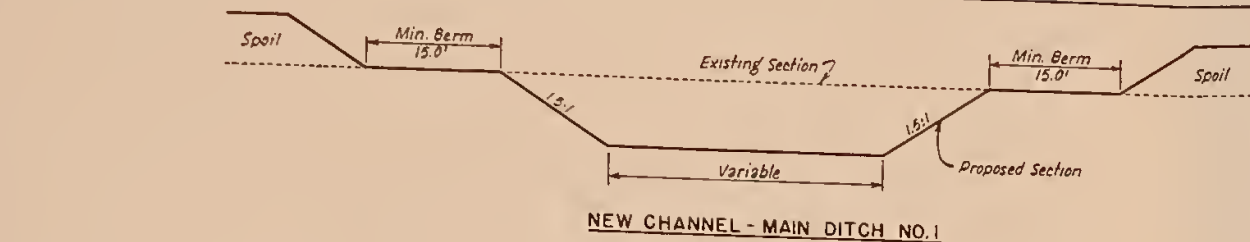


Figure 4  
SECTION OF A TYPICAL MULTIPLE PURPOSE STRUCTURE







## TYPICAL SECTIONS

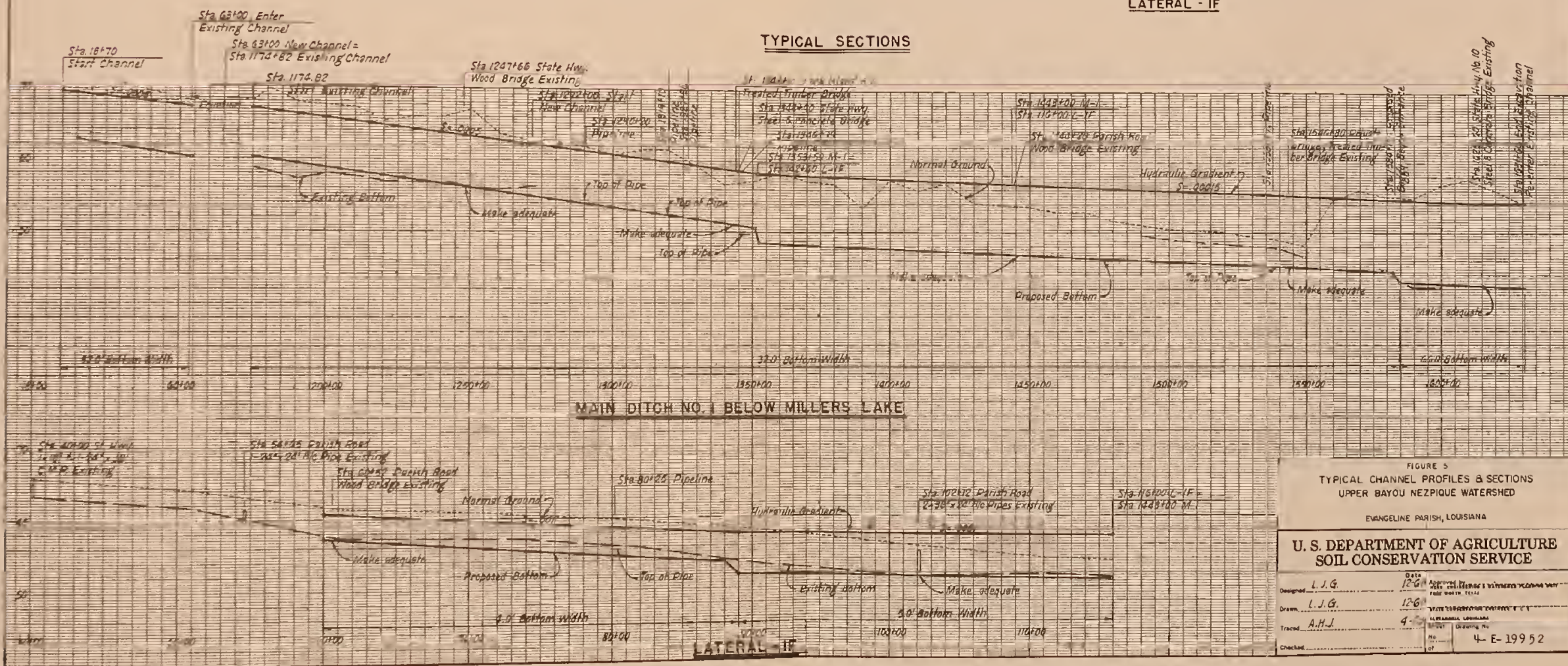


FIGURE 5  
TYPICAL CHANNEL PROFILES & SECTIONS  
UPPER BAYOU NEZPIQUE WATERSHED

EVANGELINE PARISH, LOUISIANA

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

Designed	L. J. G.	Date	12-6
Drawn	L. J. G.	12-6	
Traced	A. H. J.	4	
Checked			

4 E-19952





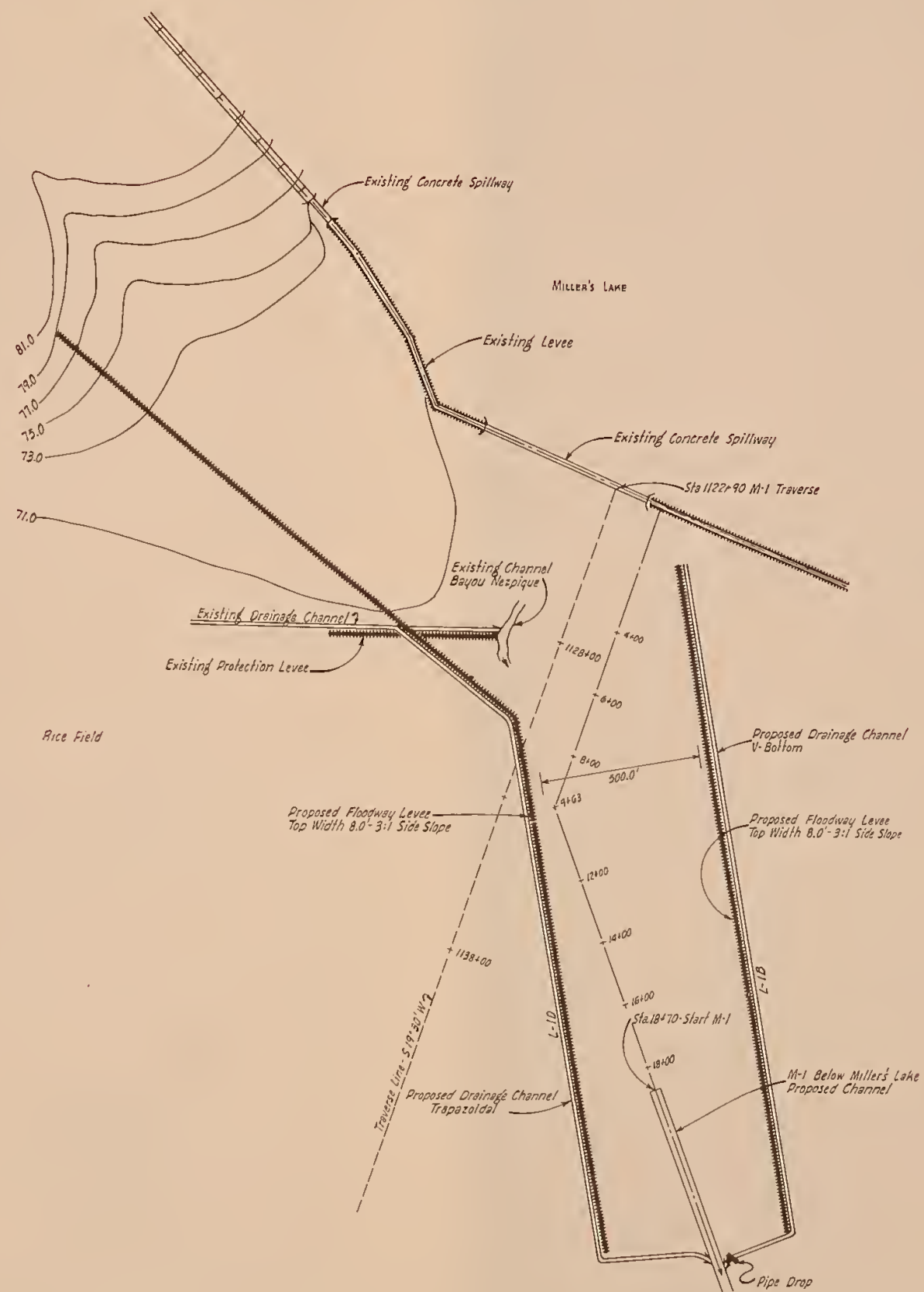


FIGURE 6  
**PROPOSED FLOODWAY**  
 UPPER BAYOU NEZPIQUE WATERSHED  
 EVANGELINE PARISH, LOUISIANA  
 UNITED STATES  
 DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE  
 ALEXANDRIA, LOUISIANA











